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C. R. Kustra

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Foreword

This report summarizes the activities of Regional and Resident Geologists for 1985, and includes accounts of mining, exploration, and geoscience activities in Ontario, prepared from information collected and filed by the Regional and Resident Geologists. Listings of new additions to the Assessment Files Records, and reports of government survey projects are provided.

Regional and Resident Geologists are located in key centres of the Mining Divisions of the Province to provide geoscience information and advice to the public on the geology and mineral deposits of Ontario. Each office maintains a library of published and unpublished reports, technical papers and monographs, publications of the Ontario Geological Survey and other government agencies, records of exploration activity submitted for assessment work credit, reports of property visits made by the Regional or Resident Geologists' staff, and information received directly from companies and individuals.

A wide variety of mineral resources-related investigations undertaken by regional minerals staff are reported here. These range from geoscience data inventories to technical studies on petroleum resources, building stone, industrial minerals, aggregate resources, and metallic and non-metallic mineral deposits.

Core storage facilities were operative in six centres including Kirkland Lake, Timmins, Sault Ste. Marie, Bancroft, Tweed, and Thunder Bay. A core collection and cataloguing program developed by the Resident Geologists' staff at these centres has been highly successful, ensuring that as much as possible of the available diamond-drill core is collected and stored.

W. Meyer became Resident Geologist at Sudbury, subsequent to the resignation of J.M. Martins; and R.A. Trevail, Chief Geologist, Petroleum Resources Laboratory, assumed the responsibilities of Regional Geologist, London.

C.R. Kustra
Regional Liaison Geologist
Ontario Geological Survey

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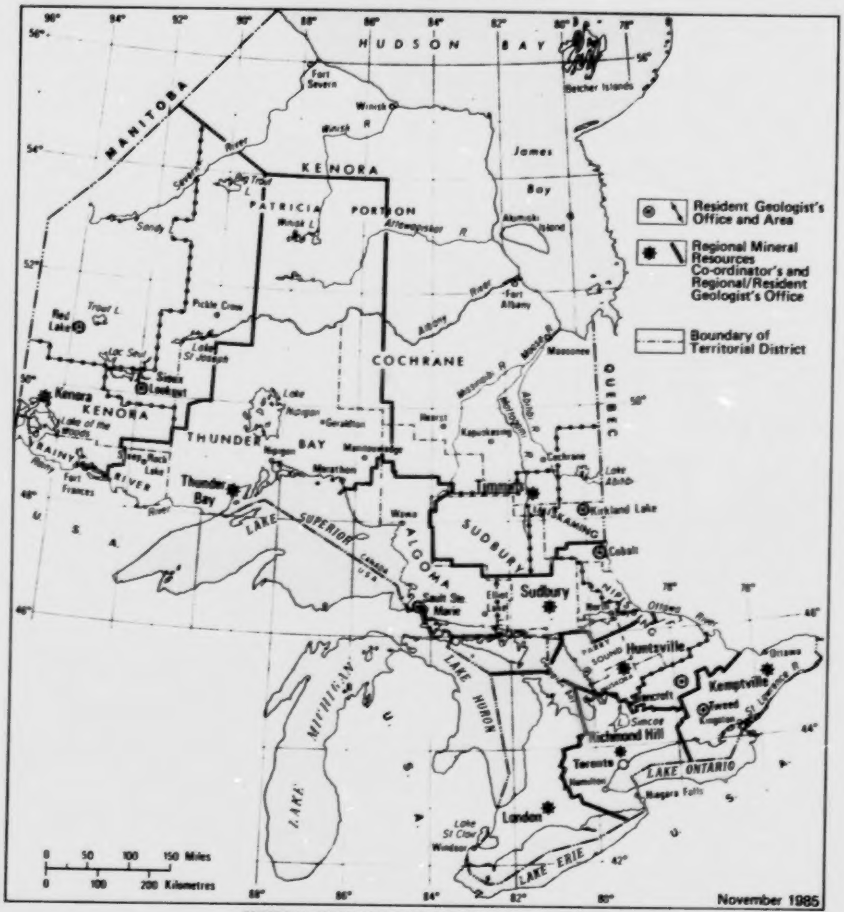
FIELD OFFICES


HUDSON BAY
MANITOBA
KENORA
PATRICIA PORTION
COCHRANE
THUNDER BAY
KENORA
RAINY RIVER
ALGOMA
SUDBURY
TIMISKAMING
NIPISSING
PARRY SOUND
QUEBEC
James Bay
Fort Severn
Winisk
Big Trout L.
Attawapiskat R.
Akimiski Island
Fort Albany
Albany River
Moosonee
Pickle Crow
Red Lake
Trout L.
Lac Seul
Lake St Joseph
Sioux Lookout
Kenora
Lake of the Woods
Fort Frances
Thunder Bay
Lake Nipigon
Nipigon
Geraldton
Marathon
Manitouwadge
Hearst
Kapuskasing
Cochrane
Lake Abitibi
Timmins
Kirkland Lake
Cobalt
Wawa
Sault Ste Marie
Elliot Lake
Sudbury
North Bay
Ottawa River
Huntsville
Bancroft
Kemptville
Ottawa
Tweed
Kingston
St Lawrence R.
Simcoe
Richmond Hill
Toronto
Hamilton
Niagara Falls
London
Lake St Clair
Windsor
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ONTARIO
LAKE ERIE
U.S.A.
Canada
U.S.A.
Resident Geologist's Office and Area
Regional Mineral Resources Co-ordinator's and Regional/Resident Geologist's Office
Boundary of Territorial District
0 50 100 150 Miles
0 100 200 Kilometres
96° 94° 92° 90° 88° 86° 84° 82° 80° 78°
56° 54° 52° 50° 48° 46° 44° 42°

November 1985

MINERAL RESOURCES CO-ORDINATORS' OFFICES

Ministry of Northern Development and Mines

Northwestern Region	810 Robertson St., Box 5160, Kenora P9N 3X9	(807) 468-3111
North Central Region	435 James St. S., Thunder Bay P7C 5G6	(807) 475-1331
Northern Region	60 Wilson Ave., Timmins P4N 2S7	(705) 267-1401
Northeastern Region	10th fl., 199 Larch St., Sudbury P3E 5P9	(705) 675-4128
Algonquin Region	Brendale Sq., Box 9000, Huntsville P0A 1K0	(705) 789-9611

Ministry of Natural Resources

Eastern Region	Concession Road, Kemptville K0G 1K0	(613) 258-3413
Central Region	10670 Yonge St., Richmond Hill L4C 3C9	(416) 884-9203
Southwestern Region	659 Exeter Rd., Box 5463, London N6A 4L6	(519) 681-5350

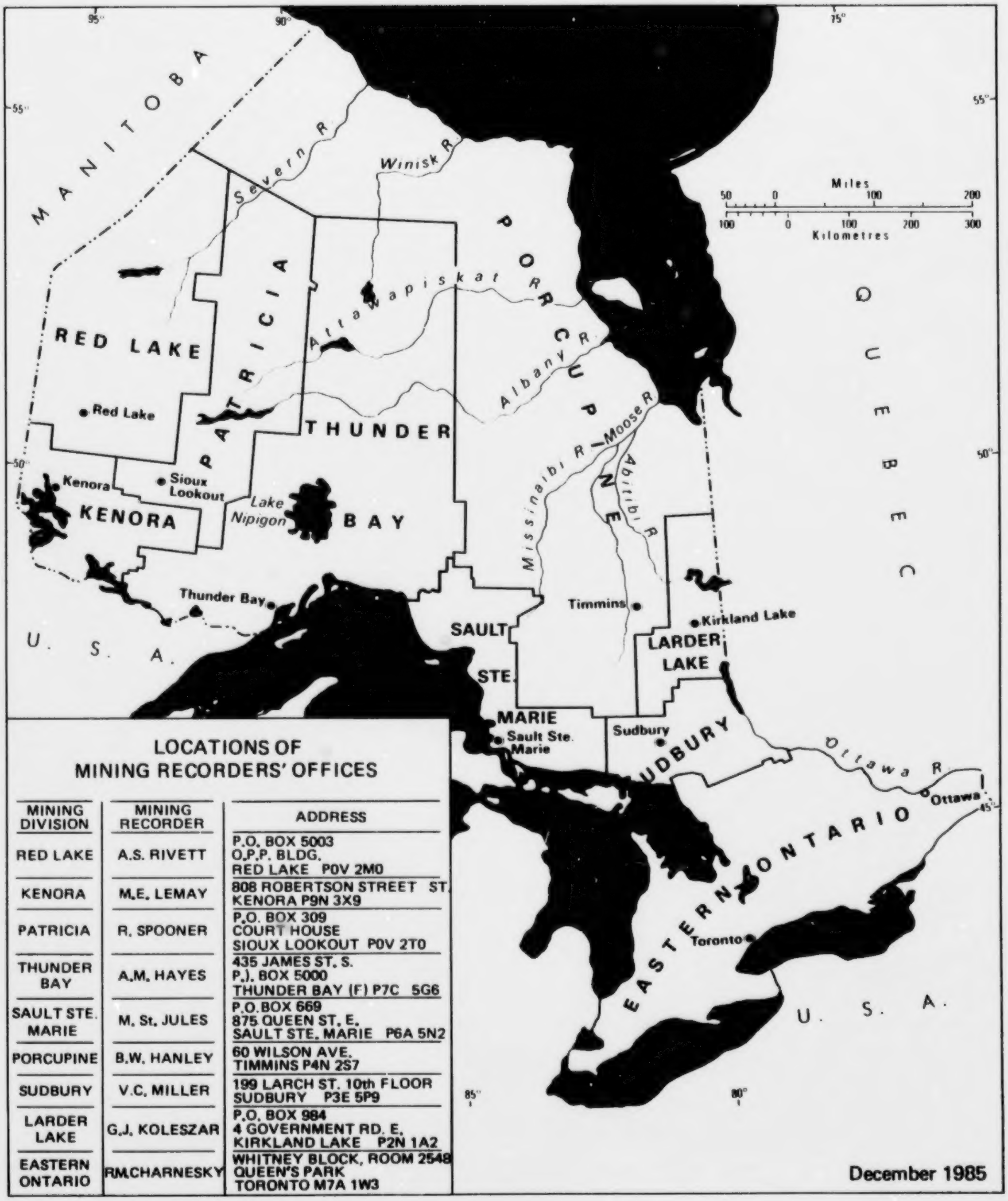
REGIONAL/RESIDENT GEOLOGISTS' OFFICES

Ministry of Northern Development and Mines

Kenora	808 Robertson St., Box 5080, Kenora P9N 3X9	(807) 468-9841
Red Lake	Ont. Govt. Bldg., Box 5003, Red Lake P0V 2M0	(807) 727-2253
Sioux Lookout	Court House Bldg., Box 309, Sioux Lookout P0V 2T0	(807) 737-1140
Thunder Bay	435 James St., S., Thunder Bay P7C 5G6	(807) 475-1331
North Clay Belt and Lowland	60 Wilson Ave., Timmins P4N 2S7	(705) 267-1401
Timmins	60 Wilson Ave., Timmins P4N 2S7	(705) 267-1401
Kirkland Lake	4 Government Rd., E., Kirkland Lake P2N 1A2	(705) 567-5242
Sudbury	10th fl., 199 Larch St., Sudbury P3E 5P9	(705) 675-4128
Sault Ste. Marie	875 Queen St. E., Sault Ste. Marie P6A 2B3	(705) 949-1231
Cobalt	Box 230 Presley St., Cobalt P0J 1C0	(705) 679-8558
Huntsville	Brendale Sq., Box 9000, Huntsville P0A 1K0	(705) 789-9611
Bancroft	Hwy. 28, Box 500, Bancroft K0L 1C0	(613) 332-3940

Ministry of Natural Resources

Tweed	255 Metcalf St., Box 70 Tweed K0K 3J0	(613) 478-2330
Richmond Hill	10670 Yonge St., Richmond Hill L4C 3C9	(416) 884-9203
London	458 Central Ave., London N6B 2E5	(519) 433-8431


95°
90°
75°
55°
55°
50°
50°
45°
85°
80°
MANITOBA
Severn R.
Winisk R.
Miles
50
0
100
200
100
0
100
200
300
Kilometres
PORCUPINE
QUEBEC
RED LAKE
PATRICIA
Attawapiskat R.
Albany R.
Moose R.
Missinaibi R.
Abitibi R.
Red Lake
THUNDER
BAY
Sioux Lookout
Kenora
KENORA
Lake Nipigon
Thunder Bay
U. S. A.
SAULT
STE.
MARIE
Sault Ste. Marie
Timmins
Kirkland Lake
LARDER
LAKE
Sudbury
SUDBURY
Ottawa R.
Ottawa
EASTERN ONTARIO
Toronto
U. S. A.

LOCATIONS OF MINING RECORDERS' OFFICES

MINING DIVISION	MINING RECORDER	ADDRESS
RED LAKE	A.S. RIVETT	P.O. BOX 5003 O.P.P. BLDG. RED LAKE P0V 2M0
KENORA	M.E. LEMAY	808 ROBERTSON STREET ST. KENORA P9N 3X9
PATRICIA	R. SPOONER	P.O. BOX 309 COURT HOUSE SIOUX LOOKOUT P0V 2T0
THUNDER BAY	A.M. HAYES	435 JAMES ST. S. P.). BOX 5000 THUNDER BAY (F) P7C 5G6
SAULT STE. MARIE	M. St. JULES	P.O.BOX 669 875 QUEEN ST. E. SAULT STE. MARIE P6A 5N2
PORCUPINE	B.W. HANLEY	60 WILSON AVE. TIMMINS P4N 2S7
SUDBURY	V.C. MILLER	199 LARCH ST. 10th FLOOR SUDBURY P3E 5P9
LARDER LAKE	G.J. KOLESZAR	P.O. BOX 984 4 GOVERNMENT RD. E. KIRKLAND LAKE P2N 1A2
EASTERN ONTARIO	RM.CHARNESKY	WHITNEY BLOCK, ROOM 2548 QUEEN'S PARK TORONTO M7A 1W3

December 1985

Conversion Factors for Measurements in Ontario Geological Survey Publications

If the reader wishes to convert imperial units to SI (metric) units or SI units to imperial units the following multipliers should be used:

CONVERSION FROM SI TO IMPERIAL			CONVERSION FROM IMPERIAL TO SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
			LENGTH		
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709 7	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
			AREA		
1 cm²	0.155 0	square inches	1 square inch	**6.451 6**	cm²
1 m²	10.763 9	square feet	1 square foot	**0.092 903 04**	m²
1 km²	0.386 10	square miles	1 square mile	2.589 988	km²
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
			VOLUME		
1 cm³	0.061 02	cubic inches	1 cubic inch	**16.387 064**	cm³
1 m³	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m³
1 m³	1.308 0	cubic yards	1 cubic yard	0.764 555	m³
			CAPACITY		
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
			MASS		
1 g	0.035 273 96	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 75	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 62	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 908 8**	t
			CONCENTRATION		
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

1 ounce (troy)/ton (short)	20.0	pennyweights/ton (short)
1 pennyweight/ton (short)	0.05	ounce (troy)/ton (short)

NOTE—Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries published by The Mining Association of Canada in cooperation with the Coal Association of Canada.

REPORT OF ACTIVITIES
1985
REGIONAL AND RESIDENT GEOLOGISTS

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edited by
C.R. Kustra[1]

[1] Regional Liason Geologist, Ontario Geological Survey. This report is published with the permission of V.G. Milne, Director, Ontario Geological Survey.

1. Kenora Resident Geologist Area, Northwestern Region

C.E. Blackburn[1], M.R. Hailstone[2], J. Parker[3], and C.C. Storey[4]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[3]Economic Geologist, Ontario Ministry of Northern Development and Mines, Kenora

[4]Drill Core Library Geologist, Ontario Ministry of Northern Development and Mines, Kenora

INTRODUCTION

Current permanent staff in the Resident Geologist's office includes C.E. Blackburn, Resident Geologist, and M.R. Hailstone, Resource Geologist. Contract staff during 1985 comprised the following people: Dolores Danielson, Susan Turner, and Sheri Rowan, clerk-typists; C.C. Storey commenced duties as Drill Core Library Geologist, assisted by C.B. Ravnaas; J. Parker, funded by the Ontario Ministry of Northern Development and Mines, continued an Economic Geologist program in the general Dryden-Ignace area, assisted by R. Schienbein; M. Patterson, funded by the Ontario Ministry of Northern Development and Mines, prepared Geological Data Inventory Folios.

RESIDENT GEOLOGIST STAFF ACTIVITIES

The continued progress of Nuinsco Resources Limited's gold exploration and advanced evaluation at Cameron and Rowan Lakes was monitored throughout 1985 by numerous on-site visits and contacts with company personnel. Of the properties at an advanced stage at the end of 1984, those of Nuinsco were the only ones that remained active throughout 1985. Numerous properties and areas undergoing active exploration were visited. These are: the Abraham Occurrence and associated Neda vein near Sioux Narrows, under evaluation by McManus Red Lake Mines; Lynx-Canada Explorations Limited's and Sparton Resources Incorporated's gold joint venture in the Bennett Lake area; Canadian Nickel Company Limited's option on the old Virginia Mine in the Atikwa Lake area; Kidd Creek Mines Limited's option on A. Kozowy's gold prospect at Flambeau Lake, Aubrey and Van Horne Townships; Cleyo Resources Incorporated's Golden Star and Isabella Mine properties near Vine Centre, under evaluation by David Bell and Associates; Corporation Falconbridge Copper's option from R.W. Fairservice of his gold property at the south end of the Lawrence Lake Batholith, in the Bluffpoint Lake area; evaluation for Kenora Prospectors and Miners Limited of the eastward extension of the old Cornucopia Mine workings at Bag Bay of Shoal Lake; Kennco Explorations (Canada) Limited's drill program at the old Scramble Mine in Jaffray Township under option from Boise Cascade Canada Limited; the exploration by Homestake Mineral Development Company along the Crowduck Lake-Rush Bay Lineament, Lake of the Woods, including their option on the Nor-Penn gold occurrence from Academy Explorations Limited; the option of B.P. Canada Incorporated (Selco Division) from R.W. Fairservice on the Thrasher gold prospect in the Lobstick Bay area; Sparton Resources Incorporated's gold exploration at Manitou Stretch in the Napanee Lake area; Kidd Creek Mines Limited's options on the old Gold Hill, Black Jack, and Golden Gate Prospects in the Bigstone Bay area, Lake of the Woods; and Corporation Falconbridge Copper's option on the McKenzie-Gray Occurrence in the Bad Vermilion Lake area. Other prospects under evaluation, and inactive mineral showings were examined and reported on during the year. The Kenora Resident Geologist area is shown in Figure 1.1.

A major undertaking that came to fruition in the Spring was the hosting of the 31st Annual Institute on Lake Superior Geology in Kenora, May 6-11, 1985. The meeting was organized by the staff of the Resident Geologist's office, Kenora, with major cooperation from the Precambrian and Mineral Deposits Sections of the Ontario Geological Survey. A total of 243 people registered for the conference, including professional geologists and students from Canada and the U.S.A. The program consisted of three pre-meeting and three post-meeting field trips, and two days of technical papers. Field trips, discussed in detail in the Field Trip Guidebook (Beakhouse 1985), were designed to give an overview of Precambrian geology and mineral deposits within Kenora Mining Division, and covered the following topics: geologic setting and style of gold mineralization in the Lake of the Woods area, including a side trip to Nuinsco Resources Limited's Cameron Lake gold property; geologic relationships in the vicinity of the Wabigoon-Winnipeg River subprovincial boundary near Kenora; interpretation of volcanic facies in the Berry River Formation, near Sioux Narrows; and granitoid related mineralization in the Dryden area.

At the technical session, 58 papers were presented, both orally and as posters, covering geological topics in both the northern states of the U.S.A., and in Ontario and Manitoba. Abstracts were published in an Abstracts volume (Blackburn 1985)

Geoscience lectures and field trips were provided for Rough Rock and Gelley Lake Junior Ranger Camps, local schools, and a manpower training course. Liaison was maintained with Ontario Geological Survey field parties. J. Parker, Economic Geologist, presented a very successful prospecting course at Dryden, in 10 weekly evening sessions, and a field trip. Average attendance was 60 people.

MINING ACTIVITY

Following expenditures in 1984 in the $5 million range at the Duport Mine gold property of Consolidated Professor Mines Limited by Union Carbide Exploration Corporation, no further work was carried out by that company in 1985.

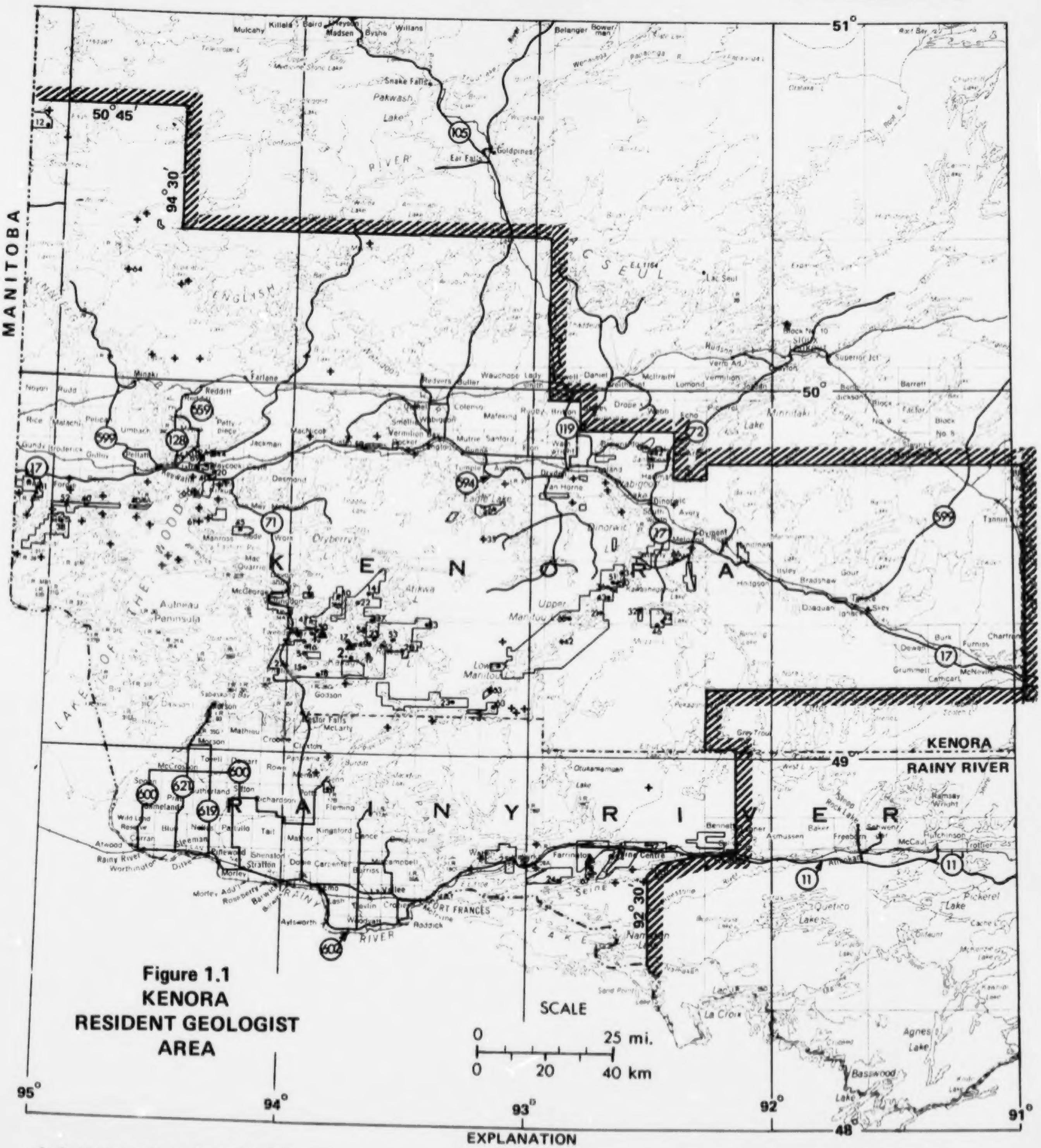
51°
50°45'
94°30'
MANITOBA
ENGLISH RIVER
LAC SEUL
50°
K E N O R A
LAKE OF THE WOODS
Aulneau Peninsula
Upper Manitou Lake
Lower Manitou
KENORA
RAINY RIVER
49°
R A I N Y R I V E R
FORT FRANCES
RAINY RIVER
Rainy Lake
92°30'
Quetico Lake
Pickerel Lake
Agnes Lake
Basswood Lake
La Croix
SCALE
0
25 mi.
0
20
40 km
95°
94°
93°
92°
91°
48°
17
71
105
119
72
599
594
11
600
602
619
621
659
128
502

Figure 1.1
KENORA
RESIDENT GEOLOGIST
AREA

EXPLANATION

▲ Properties under evaluation in 1985
  1. Dubenski Gold Mines Limited-Caswell Williams Prospect
  2. Nuinsco Resources Ltd. - Echo Bay Mines Limited - Cameron Lake Prospect
  3. Titan Titanium International

• Exploration Activities in 1985 (keyed to table 3)

▭ Extent of contiguous staking to Dec 1, 1985 (may include patented claims in areas of intense staking)

+ Isolated active claim blocks as of Dec 1, 1985

Based on results of the 1984 program, Consolidated Professor released recalculated reserve figures in mid-1985 (The Northern Miner, June 6, 1985). The new figures are 1 445 235 tons grading 0.33 ounce gold per ton across an average mining width of 9 feet. This includes proven reserves of 132 000 tons grading 0.41 ounce gold per ton across a width of 8.97 feet, and probable reserves of 556 742 tons grading 0.34 ounce per ton across 10.59 feet. These figures compare with previous estimates of 1 927 000 tons grading 0.3 ounce per ton released by Union Carbide following their surface exploration program in 1983, and prior to the underground development. Reduced tonnage estimates in the East zone, where reserves now stand at 397 000 tons grading 0.38 ounce gold per ton, were cited as a reason for the overall reduction in tonnage outlined. This reduction in tonnage in the East zone was compensated by the underground program exposing several zones of higher than average grade material in the Main zone, according to the Northern Miner article: in the north drift on the 440-foot level, a grade of 0.6 ounce gold per ton was assayed along 331 feet, for a width of 9.5 feet, widening to 25 feet in places.

The Northern Miner article also revealed that Union Carbide spent $4.5 million on the project in 1984, funding 3600 feet of access ramp and crosscuts, 2100 of drifting, and 21 740 feet of drilling. Also 6000 tons of development muck, which is stockpiled on surface, was mined, and a bulk smple of 2000 tons returned an assay of 0.31 ounce gold per ton.

In November, Consolidated Professor announced that Union Carbide had made a payment of $500 000 to continue its participation in the joint venture, and has until November 1, 1986, to make a commitment to bring the property to production.

G.R. Cunningham-Dunlop, President, Consolidated Professor Mines Limited (personal communication, November 1985) confirms that, following relogging of all 1984 drill core and assaying of 200 extra samples, A.C. Troop, consultant for Consolidated Professor, has newly calculated reserves to be in the 1.4 million tons range, at a grade of 0.32 ounce gold per ton.

Following initial establishment of a small milling operation in the Mine Centre area in 1984, in which a 75 ton per day mill was placed on site at the Manhattan Prospect by Royal Gold and Silver Corporation in their Mine Centre Gold venture with Oro Treck Resources Corporation, operations wound down early in 1985.

Federal Kirkland Mines indicated (The Northern Miner, June 20, 1985) their intention to recover gold from tailings near Mine Centre. A centrifugal mill was located near the old Golden Star Mine in the Bad Vermilion Lake area.

QUARRYING ACTIVITY

DIMENSION STONE

Three dimension stone quarries, viz. Granite Quarriers (GQI) Incorporated, Nelson Granite Limited, and Rush Bay Quarries, operated during the year. Nelson Granite Limited and Granite Quarriers (GQI) Incorporated produce pink granite for monuments and for building construction from a small granite stock 9 km west of the town of Vermilion Bay. Production from both quarries increased over 1984 levels. Granite Quarriers is installing a replacement hoist and has additional mobile equipment in use at the quarry. Nelson Granite Limited is now operating a small finishing plant at the quarry site to produce monuments, curbing, and sales samples. One hundred metres of curbing made by Nelson Granite was installed on Whyte Avenue in the Town of Dryden in 1985.

Flagstone was quarried by Rush Bay Quarries from a sheared felsic tuff deposit in Forgie Township. This stone is green to dark grey in colour on the fresh surface, with rusty brown shades on the foliation surface due to ground water action. The surface colour varies from light brown to dark red, the dark red being most desirable.

A quarry permit to remove soapstone from the dump at the Eagle Lake soapstone quarry was issued to Frank Thorgrimson of Keewatin.

CRUSHED STONE

Crushed stone was produced in large quantities by Canadian National Railways (C.N.R.) at White in Rice Township and Canadian Pacific Railways (C.P.R.) at Hawk Lake in MacNicol Township and Melgund Lake in Avery Township. Material is quarried and crushed by a contractor and stockpiled at the quarry site for use as required for roadbed maintenance and repair. The C.P.R. quarry at Hawk Lake did not produce new crushed stone, but material was removed from the stockpile and some of the undersize material was screened and sold for local construction use. The railway ballast quarries are the largest bedrock producers and are responsible for the vast majority of the yearly production of stone of all kinds, which ranges from 500 000 to 900 000 tonnes within the Kenora Legislative District (figures are from Ontario Mineral Score 1981, 1982, 1983, 1984).

Approximately 164 475 m^3 (215 000 cubic yards) was produced from the C.N.R. White quarry. Production data for the C.P.R. quarry is not yet available.

Several companies operated bedrock quarries for crushed stone for aggregate, road construction, and similar uses; these include Degagne Brothers Limited in Jaffray Township, George Kupper Contracting Limited in Mutrie Township, Towland-Hewitson Construction in Jaffray Township, and Eino Stenburg in Britton Township. Two other quarries were operated in Redditt Township near Redditt, one for rock fill and one for aggregate for the reconstruction of Highway 658. Figure 1.3 shows the locations of quarrying activity.

PEAT AND BLACK SOIL

Ten quarries producing peat or black soil were active. Small amounts of peat for horticultural use were produced by Arctic Peat Moss Limited of Barwick, from a bog in Carpenter Township. The company has two processing plants in Barwick, one for baled peat and one for top moss, the unhumified top layer of the bog sold for plant bedding, packing, and similar horticultural uses. Only top moss was produced during 1985. Du-Nor Products of Fort Frances processes well hu-

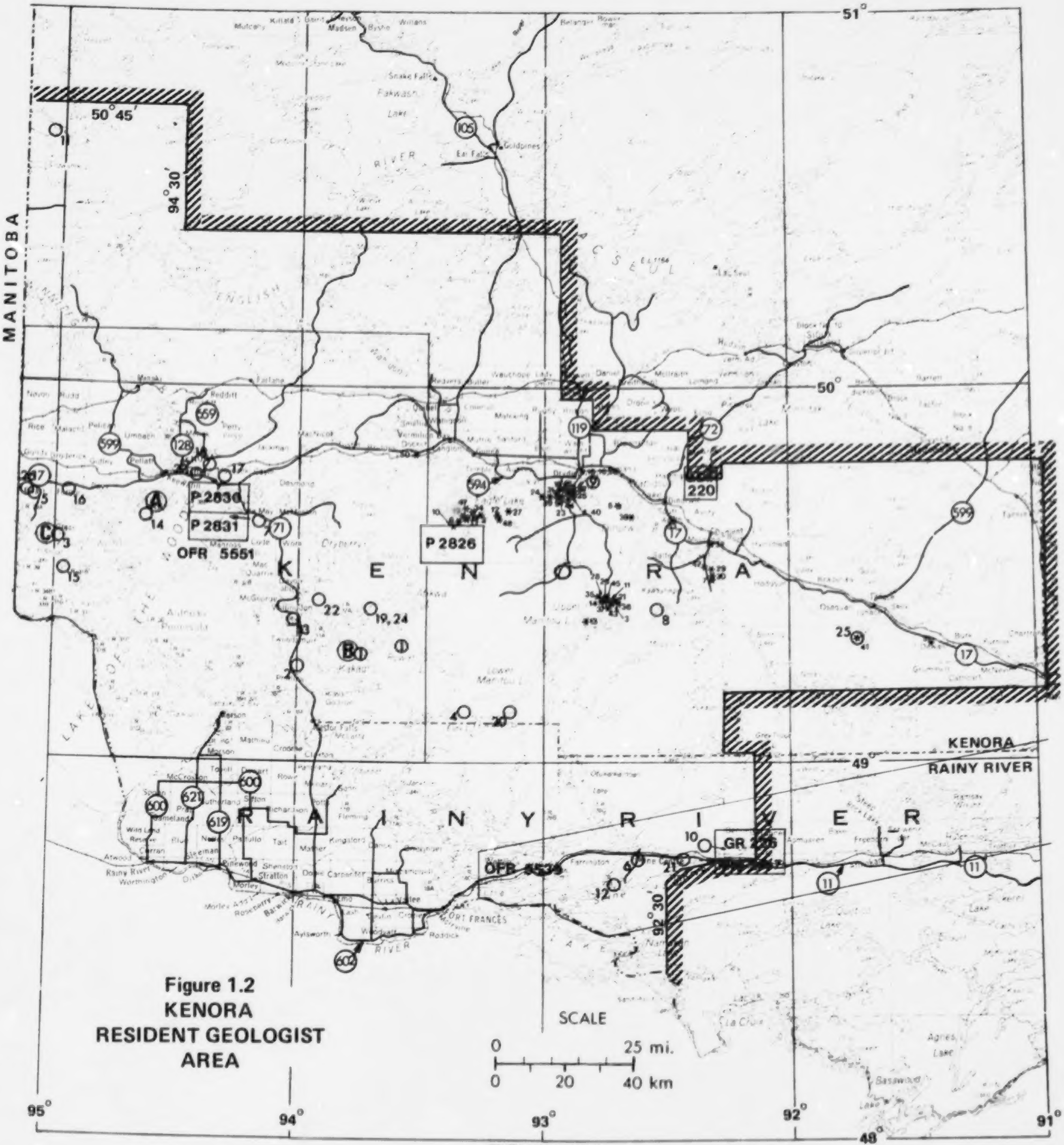
MANITOBA
KENORA
RAINY RIVER
P 2836
P 2831
OFR 5551
P 2826
220
GR 226
OFR 5539
SCALE
0 25 mi.
0 20 40 km
51°
50°
49°
48°
50°45'
94°30'
92°30'
95°
94°
93°
92°
91°
FORT FRANCES

Figure 1.2
KENORA
RESIDENT GEOLOGIST
AREA

EXPLANATION

GR 226 Map or Report issued by Ontario Geological Survey, 1985 (keyed to Table 1.2)

Ⓐ Location of OGS Field Party and/or Special Project, 1985 (keyed to text)

* Property visits, Dryden Economic Geologist program (keyed to table found in text)

○ Property visits, Resident Geologist Office (keyed to table found in text)

▨ Boundary of Resident Geologist's Area

TABLE 1.1

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1985*	2,108	5,127	10,835	45,817	182,064	27,126	275,364
1984	3,261	3,042	13,854	36,055	281,359	23,670	364,692
1983	11,061	1,472	13,635	35,746	42,221	12,006	106,397
1982	1,579	1,609	4,046	23,525	26,270	5,330	68,439
1981	2,121	846	4,076	26,127	37,624	3,383	72,732
1980	1,877	788	3,208	15,428	3,149	859	21,368
1979	984	1,357	2,119	9,992	10,658	1,420	24,182
1978	808	1,357	2,300	22,299	7,576	2,143	34,934
1977	1,495	1,585	2,820	15,405	11,366	1,760	33,838
1976	1,380	2,125	3,234	25,030	21,367	5,960	55,042
1975	1,677	2,452	3,975	23,584	31,509	940	57,266
1974	2,653	1,076	4,727	29,496	18,049	3,070	52,134

*to Nov. 30

mified peat for use as potting soil. During the early part of 1985, production was from a site within the town of Fort Frances. The company is preparing to open a bog in Miscampbell Township and has a plant in Fort Frances, but is not presently operating. Nu-Terra Limited of Kenora produces similar soil from a peat deposit in Jaffray Township near Kenora. Black soil, or well humified peat for use in landscaping, is produced by several contractors, and quarry permits for its removal were issued or renewed for seven sites.

GRAVEL

A total of 243 quarry permits were issued for sand and gravel extraction from Crown Land. The largest users of gravel, as shown by numbers of permits, are the forest products companies for road construction and maintenance. Municipalites, Ministry of Transportation and Communications, contractors, and private users account for the rest. Many contractors own or lease gravel pits on private land where quarry permits are not required. The number of these pits is not presently recorded. Three permits were issued for the removal of large boulders for unspecified uses.

EXPLORATION ACTIVITY

Data in Table 1.1 indicate that exploration for gold in Kenora Mining Division in 1985 continued at the high level set in 1984, when measured in terms of man days of assessment work on mining claims (but less than 300 000 compared with 364 672 in 1984). Although staking activity was down somewhat compared with 1984 (2000-plus claims against 3261 in 1984), while cancellations were up sharply (more than 5000, compared with 3042 in 1984), the number of active claims remained high, at about 11 000. While the gold price remained low compared to the 1983 high of around $500 per ounce, its stability at about the $320 to $340 per ounce level probably contributed to this continuing favourable situation.

Tables 1.3 and 1.4 list the exploration activity during the year and the assessment work and other information received.

TABLE 1.2 MAPS AND REPORTS PERTAINING TO THE KENORA RESIDENT GEOLOGIST AREA PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Ontario Geological Survey Report

Report 226

Open File Reports

OFR 5539

OFR 5551

Preliminary Maps - Geological Series

P.2826

P.2830

P.2831

Geological Map

Map 2467

Miscellaneous Papers

MP 122

MP 126

MP 127

Geological Data Inventory Folio

GDIF 220

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 1.3

Number on Figure	Individual or Company	Activity
1	Agassiz Resources Ltd.	Geophysical Survey, Beadle Lake Area
2	Agassiz Resources Ltd.	Geochemical Survey, Menary Township
3	Agassiz Resources Ltd.	Geological Survey, Napanee Lake Area
4	Beved Resources Inc.	Geophysical Survey, Boyer Lake Area
5	Bigstone Minerals Ltd.	Geophysical Survey, Dogpaw Lake Area
6	Billiton Canada Limited	Geological Survey, Laval Township
7	Black Gold and Gas Ltd.	Geophysical Survey, Napanee Lake Area
8	Boise Cascade Canada Ltd.	Geological Survey, Jaffray Township
9	B.P. Resources Canada Limited	Geological and Geophysical Surveys and Diamond Drilling, Lobstick Bay Area
10	B.P. Resources Canada Limited	Diamond Drilling, Lobstick Bay Area
11	Busch,David J.	Geological Survey, Ewart Township
12	Busch,David J.	Geophysical Survey, Rickaby Lake Area
13	Campbell Resources Inc.	Airborne Geophysical Survey, Lawrence and Tadpole Lakes Areas
14	Canadian Nickel Company Limited	Geophysical Survey, Atikwa Lake Area
15	Canadian Nickel Company Limited	Geophysical Survey, Dogpaw Lake Area
16	Canadian Nickel Company Limited	Diamond Drilling, Dogpaw and Rowan Lakes Areas
17	Canadian Nickel Company Limited	Diamond Drilling, Dogpaw and Rowan Lakes Areas
18	Canadian Nickel Company Limited	Geophysical Survey, Heronry Lake Area
19	Canolan Resources Ltd.	Geophysical Survey, Rowan Lake Area
20	Clark,G.	Stripping, Geological and Geophysical Surveys, Haycock Township
21	Cochrane Oil and Gas Ltd.	Geological and Geophysical Surveys, Lower Manitou, Boyer and Harper Lakes Areas
22	Cominco Ltd.	Geophysical Survey, Atikwa Lake Area
23	Corporation Falconbridge Copper	Geophysical Survey and Diamond Drilling, Bluffpoint Lake Area
24	Corporation Falconbridge Copper	Geophysical Survey, Halkirk Township
25	Corporation Falconbridge Copper	Diamond Drilling, Halkirk and Watten Townships
26	Cousineau L.E.	Stripping, Manual Work and Mechanical Work, Halkirk Township
27	Cymbal Exploration Inc.	Geochemical Survey, Phillips Township
28	D.K.Platinum Corporation	Geological and Geophysical Surveys, Rowan Lake Area
29	Dunfrazier Gold Exploration Inc.	Geological Survey, Dogpaw Lake Area
30	Falconbridge Limited	Diamond Drilling, Dogpaw Lake Area
31	Glatz,A.	Geophysical Survey, Laval Township
32	Gold Washe Ltd.	Geological and Geophysical Surveys, Boyer Lake Area
33	Great Central Mines Limited	Geophysical Survey, Rowan Lake Area
34	Green River Resources Ltd.	Geophysical Survey, Turtlepond Lake Area
35	Greenstone Resources Ltd.	Geophysical Survey, Buchan and Osbourne Bays Areas
36	Hall, E.M.	Geophysical Survey, Boyer Lake Area
37	Hansen, J.E.	Airborne Geophysical Survey, Atikwa and Rowan Lakes Areas
38	Hansen, J.E.	Geological and Geophysical Surveys, Glass Township
39	Homestake Explorations Limited	Geological Survey, Little Turtle Lake Area
40	Homestake Mineral Development Co.	Airborne Geophysical and Geological Surveys, Clearwater and Echo Bays Areas, and Boys and Echo Townships

TABLE 1.3 Continued

Number on Figure	Individual or Company	Activity
41	Hood, W.C.	Geological and Geophysical Surveys, Kirkup Township
42	Jalna Resources Limited	Airborne Geophysical Survey, Laval Township, and Kawashegamuk, Lower Manitou, Meggisi, Boyer and Mang Lakes Areas
43	June Resources Inc.	Airborne Geophysical Survey, Boyer Lake Area
44	Kennco Exploration Limited	Geological and Geophysical Surveys, Haycock Township
45	Knox, W.T.	Geological and Geophysical Surveys, Code Township
46	Kozowy, A.	Airborne Geophysical Survey, Wapageisi Lake Area
47	Kriese, K.	Geophysical Survey, Dogpaw Lake Area
48	Kroocmo, D.M.	Stripping, Trenching and Mechanical Work, Factor Lake Area
49	Loydex Resources Inc.	Geophysical Survey, Rowan Lake Area
50	Marge Enterprises Ltd.	Airborne Geophysical Survey, Turtlepond Lake Area
51	Marlet Resources Ltd.	Airborne Geophysical, Boyer Lake Area
52	Morrison, M.S.	Airborne Geophysical Survey, Echo Bay Area
53	Nuinsco Resources Ltd.	Diamond Drilling, Rowan Lake Area
54	P.I.R.P. Holdings Inc.	Trenching, Bad Vermilion Lake Area
55	Proteus Resources Limited	Airborne Geophysical and Geological Surveys, Dogpaw Lake Area
56	Raleigh Resources Ltd.	Geological Survey, Buchan Bay Area
57	Redden, J.W.	Geophysical Survey,Bennett Lake Area
58	Regan, V.	Geological and Geophysical Surveys, Rowan Lake Area
59	Rio Algom Exploration Inc.	Geophysical Survey, Bridges Township
60	Roberecki, E.	Manual Work, Bigstone Bay Area
61	Roberecki, E.	Manual Work, Manross Township
62	Silver Lake Resources Inc.	Diamond Drilling, Rowan Lake Area
63	Sparton Resources Inc.	Geological and Geophysical Surveys and Diamond Drilling, Napanee Lake Area
64	Sparton Resources Inc.	Geological Survey, Paterson Lake Area
65	Stephens, Gladys Anne	Geophysical Survey, Ewart Township
66	Sulpetro Minerals Limited	Geochemical Survey and Diamond Drilling, Melgund Township
67	Titan Titanium International Inc.	Airborne Geophysical Survey, and Diamond Drilling, Bliss Lake Area
68	Wright, R.J.	Mechanical Work, Harper Lake Area
69	553215 Ontario Ltd.	Manual Work, Jaffray Township

TABLE 1.4

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

KENORA MINING DIVISION

SYMBOLS AND ABBREVIATIONS

AMag - Airborne Magnetometer Survey
AEM - Airborne Electromagnetic Survey
Ag - Silver
Assess - Assessment Work
Au - Gold
BM - Base Metals
Cons Rpt - Consultant's Report
Co - Cobalt
Cu - Copper
DD - Diamond Drilling (where shown, the number following "DD" indicates the number of holes drilled and the total length drilled respectively)
EM - Electromagnetic Survey
Expend - Expenditure Credits
Geochem - Geochemical Survey
GL - Geological Survey or Report
HEM - Horizontal Loop Electromagnetic Survey
IP - Induced Polarization
Mag - Magnetometer Survey
Man - Manual Work
Mech - Mechanical
Mo - Molybdenum
Ni - Nickel
OMEP - Ontario Mineral Exploration Program
Pb - Lead
Pt - Platinum
Rad - Radiometric Survey
SA - Sampling, Assaying
Sb - Antimony
Seism - Seismic Geophysical
Sn - Tin
SP - Self Potential
STr - Stripping
Ti - Titanium
Tr - Trenching
W - Tungsten
Zn - Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Atikwa Lake	52F/05 NE	Canadian Nickel Co.	Au	Assess	GL	1984	2.7613	FF-1
	52F/05 NE	Cominco Ltd.	Au	Assess	EM,Mag	1985	2.8008	EE-2
	52F/05 NE	Knox, William T.	Au	Assess	Rad	1984	2.7667	BB-1
	52F/05 NE	Knox, William T.	Au	Assess	Mag	1985	2.8227	FF-2
Aubrey Township	52F/10 NW	Hoban, Michael John	Au	Assess	Tr	1984	-	OO-6
Bad Vermilion Lake Little Turtle Lake	52C/10 NE 52C/15 SE	Central Crude Ltd.	Au	Assess	GL, SA	1983	2.7424	OO-3
Bad Vermilion Lake	52C/10 NE	P.I.R.P. Holdings Inc.	Au	Assess	Tr	1985	-	MM-6
Bad Vermilion Lake	52C/10 NE	Titan Titanium International	Ti	Assess	DD 8-2531'	1984	-	PP-1
Bad Vermilion Lake Bliss Lake	52C/10 NE 52C/11 NE	Titan Titanium International	Ti	Assess	AEM, AMag	1984	2.7874	PP-2
Barker Bay	52F/06 SE	Wright, R.J.	Au	Assess	EM, Mag	1984	2.7296	D-3
Beadle Lake	52C/13 NW	Agassiz Resources Ltd.	Au, BM	Assess	EM, Mag	1985	2.7912	B-4
	52C/13 NW	Agassiz Resources Ltd.	Cu,Zn,Au,Ag	Assess	SA	1984	2.8165	D-5
	52C/13 NW	Lacana Ex. (1981) Limited	Au, BM	Assess	Expend, SA	1984	2.7512	E-1
Bennett Lake	52C/16 SW	Coloma Resources Ltd.	Au	Assess	DD 6-1525' GL, HEM, SA	1984	-	C-2
Bennett Lake Little Turtle Lake	52C/16 SW 52C/15 SE	Lynx Canada Explorations	Au	Assess	GL	1984	2.7798	J-4
Bennett Lake	52C/16 SW	Radden, J. W.	Au	Assess	Mag	1985	2.8241	Q-3
Bennett Twp.	52C/16 SE	Argor Explorations Ltd.	Au	Assess	AEM, AMag, GL	1984	2.7646	T-1
	52C/16 SW	Lynx-Canada Explorations	Au	Assess	GL	1984	2.7573	S-3
	52C/16 SE	Lynx-Canada Explorations	Au, BM	Assess	Expend	1983-84	2,7993	B-4
Bigstone Bay	52E/09 SW	Bigstone Minerals Ltd.	Au	Assess	GL	1984	2.8340	Q-2
	52E/09 NW	President Mines Ltd.	Au	Assess	Mech & STr	1984	-	SS-13
	52E/09 NW	Roberecki, Ed	Au	Assess	STr	1985	-	TT-3
Bliss Lake	52C/10 NW	Titan Titanium International	Ti	Assess	DD 7-2031'	1985	-	V-2
	52F/03 NW	Corporation Falconbridge Copper	Au	Assess	STr	1984	-	O-1
	52F/03 NW	Corporation Falconbridge Copper	Au	Assess	Geochem	1984	2.7841	O-2
	52F/03 NW	Corporation Falconbridge Copper	Au	Assess	Geochem	1984	2.7842	O-3
	52F/03 NW	Corporation Falconbridge Copper	Au	Assess	DD 5-1660'	1985	-	O-4
Bluffpoint Lake	52F/03 NW	Corporation Falconbridge Copper	Au	Assess	IP	1985	2.8473	O-5

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Boyer Lake	52F/07 NE	Asamera Inc.	Au	Assess	Geochem	1984	2.7571	KK-4
	52F/07 NE	Cochrane Oil & Gas Ltd.	Au	Assess	DD 1-165'	1984	–	PP-2
	52F/07 NE	Derry, Michener & Booth	–	Non Assess	AEM, AMag GL, EM, Mag	1970	–	OO-2
	52FF/07 NE 52F/10 SE	June Resources Inc.	–	Assess	AEM, AMag	1985	2.8061	QQ-1
Boyer Lake Turtlepond Lake	52F/07 NE 52F/10 SE	Sheridan J. P.	Au	OMEP	SA	1982	–	–
Boyer Lake	52F/07 NE	St. Joe Canada Inc.	Au	Assess	GL	1984	2.7374	LL-3
Bridges Twp	52F/13 SE	Rio Algom Expl. Inc.	Cu,Pb,Zn,Au	Assess	Mag	1985	2.8312	B-1
Brooks Lake Dash Lake	52F/04 NE 52F/04 SE	Jalna Resources Ltd.	Au	Assess	AMag, AEM	1985	–	–
Brooks Lake	52F/04 NE	Noranda Exploration Company Limited	Au	Assess	SA	1984	2.7500	I-3
	52F/04 NE	Noranda Exploration Company Limited	Au	Assess	GL	1984	2.7489	I-4
Brooks Lake Dogpaw Lake Rowan Lake	52F/04 NE 52F/05 SW 52F/05 SE	Sault Meadows Energy Corp.	Au	Assess	AEM, AMag	1984	2.7235	T-1
	52F/15 SE	Sanmine Explorations Inc.	Au, W	Assess	DD 18-4846'	1984	–	R-9
Brownridge Twp.	52F/15 SE	Sanmine Explorations Inc.	W	Assess	SA,Mech	1983	2.6970	R-10
Buchan Bay Osbourne Bay	52F/11 NE 52F/11 SE	Greenstone Resources Ltd.	Au	Assess	EM, Mag	1985	2.8132	BB-1
Buchan Bay	52F/11 NE	Pollock, John A.	Au	Assess	AEM, AMag	1984	2.7820	DD-1
	52F/11 NE	Raleigh Resources Ltd.	Au	Assess	DD 7-3001'	1985	–	Z-5
Clay Lake Cliff Lake Squint Lake	52K/03 SW 52K/03 NW 52K/03 SE	Rosenthal, Lorne	BM, Au	Assess	EM, GL	1984	2.7306	D-1
Clearwater Bay	52E/10 NE	Raleigh Minerals Ltd.	Au	Assess	EM, Mag	1984	2.7911	Q-1
	52E/10 NE	Raleigh Minerals Ltd.	Au	Assess	GL	1985	2.8381	Q-2
	52E/10 NE	Whymark, Wayne	Au	Assess	Expend	1984	2.8123	Y-2
Code Twp.	52E/09 SE	Burt, David	Au,Cu,Zn	Assess	AEM, AMag	1984	2.7809	V-1
	52E/09 SE	Knox, William T.	Au,BM,	Assess	Mag, Rad	1984	2.7668	U-1
Contact Bay	52F/10 NW	Harrison, John D.	–	Assess	DD 2-456'	1984	–	K-5
	52F/10 NW	Hawes, J.	Au	Assess	DD 1-455'	1984	–	RR-3
	52F/10 NW	Hawes, J.	Cu,Ni,Pt,Co	Assess	Cons Rpt	1984	2.8245	RR-4
Dogpaw Lake	52F/05 SW	Canadian Nickel Company Limited	Au	Assess	EM, Mag	1984-85	2.8365	C-7
Dogpaw Lake Heronry Lake	52F/05 SW 52F/04 NW	Canadian Nickel Company Limited	Au	Assess	GL	1984	2.7868	C-4
Dogpaw Lake Rowan Lake	52F/05 SW 52F/05 SE	Canadian Nickel Company Limited	Au	Assess	DD 3-3047'	1985	–	C-5
Dogpaw Lake	52F/05 SW	Canadian Nickel Company Limited	Au	Assess	DD 3-1106'	1985	–	C-8
	52F/05 SW	Falconbridge Ltd.	Au	Assess	DD 1-341'	1984	–	B-2
	52F/05 SW	Falconbridge Ltd.	Au	Assess	DD 1-328'	1985	–	B-3
	52F/05 SW	Falconbridge Ltd.	Au	Assess	SA	1984	2.7488	B-4
	52F/05 SW	FBM Management & Gold Corp.	Au,Ag	Assess	SA, Mech	1983	–	NNN-1
	52F/05 SW	FTM Resources Inc.	Au	Assess	EM, Mag	1984	2.7694	TT-3
	52F/05 SW	FTM Resources Inc.	Au,Ag,Cu	Assess	Geochem	1984	2.7902	TT-4
	52F/05 SW	FTM Resources Inc.	Au	Assess	Mech	1984	–	TT-5
	52F/05 SW	Flint Rock Mines Ltd.	Au	Assess	AEM, AMag	1984	2.7797	FFF-1

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Dogpaw Lake	52F/05 SW	LaFleche, G.	Au	Assess	EM, Mag, GL	1984	2.7312	EEE-2
	52F/05 SW	Micham Exploration Inc.	Au, Ag	Assess	GL	1984	2.8114	YY-2
	52F/05 SW	Phimister, Doug	Au	Assess	Mag	1984	2.8254	MMM-1
	52F/05 SW	Regal Goldfields Ltd.	Au	Assess	EM, Mag	1984	2.7687	JJJ-1
	52F/05 SW	Sherritt Gordon Mines	Au	Assess	GL, Geochem	1983	2.6752	PP-7
	52F/05 SW	539258 Ontario Ltd.	Au	Assess	EM, Mag	1984	2.7940	LLL-1
Echo Bay Clearwater Bay Glass Twp.	52E/10 NW 52E/10 NE	Homestake Mineral Dev. Co.	Au	Assess	AEM, AMag	1985	2.8373	AA-2
Ewart Twp.	52E/11 NE	Busch, David J.	Au	Assess	EM, Mag	1984	2.7763	NN-2
	52E/11 NE	Noranda Exploration Company Limited	Au	Assess	EM, Mag	1984	2.7930	P-2
	52E/11 NE	Stephens, Gladys Anne	Au	Assess	EM	1985	2.8070	OO-2
	52E/11 NE	Stephens, Gladys Anne	Au	Assess	Mag	1985	2.7907	OO-3
Factor Lake	52C/09 NE	Kroocmo, David M.	Au	Assess	Mech	1985	–	B-4
	52C/09 NE	Kroocmo, David M.	Au	Assess	STr	1985	–	B-5
Forgie Twp.	52E/10 NW	Homestake Mineral Dev. Co.	Au	Assess	GL	1985	2.8506	AA-1
Garnet Bay	52F/11 NW	Mistango Consolidated Resources Limited	Au	Assess	AEM, AMag	1984	2.7696	N-2
Glass Twp.	52E/10 SW	Hansen, Jens E.	Au	Assess	EM, Mag, GL	1985	2.8337	JJ-1
Halkirk Twp.	52C/11 NE	Corporation Falconbridge Copper	BM	Assess	STr	1984	–	PP-3
Halkirk Twp. Watten Twp.	52C/11 NE 52C/10 NW	Corporation Falconbridge Copper	BM	Assess	GL	1984-85	2.7811	PP-5
Halkirk Twp.	52C/10 NW	Corporation Falconbridge Copper	BM	Assess	HEM, Mag	1984-85	2.7990	W-1
	52C/10 NW	Cousineau, Louis E.	Mo	Assess	STr	1984	–	U-2
	52C/10 NW	Cousineau, Louis E.	Mo	Assess	Str	1984-85	–	U-3
Harper Lake	52F/07 NW	St. Joe Canada Inc.	Au	Assess	I.P., Seism	1982	2.7418	H-5
Harper Lake Boyer Lake Lower Manitou Lake	52F/07 NW 52F/07 NE 52F/07 SW	St. Joe Canada Inc.	Au	Assess	Geochem	1984	2.7648	H-6
Harper Lake	52F/07 NW	St. Joe Canada Inc.	Au	Assess	GL	1982	2.7719	H-7
Harper Lake Lower Manitou Lake	52F/07 NW 52F/07 SW	St. Joe Canada Inc.	Au, BM	OMEP	Mag, Em, DD	1983	–	–
Harper Lake	52F/07 NW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7289	J-2
	52F/07 NW	Wright, R. J.	Au	Assess	Tr, GL	1985	–	J-4
Haycock Twp.	52E/16 SE 52E/16 SW	Clark, H. G.	Au	Assess	Mag	1984	2.7709	X-5
	52E/16 SW	Kennco Explorations (Canada)	Au	Assess	EM, Mag	1985	2.8285	DD-1
	52E/16 SW	Clark, H. G., Karwacki, J.	Au	Assess	DD1-305'	1984	–	X-6
	52E/16 SW	Clark, H. G., Karwacki, J.	Au	Assess	GL	1985	2.8475	X-7
Hepburn Lake	52C/16 SE	Lynx-Canada Explorations	Au	Assess	EM, Mag, GL	1983	2.7417	B-3
Heronry Lake	52F/04 NW	Canadian Nickel Company Limited	Au	Assess	EM, Mag	1984-85	2.8149	D-5
Hodgson Twp.	52F/09 SE	Glatz, Alexander	Au	Assess	STr	1984	–	I-8
Hyndman Twp.	52F/09 SE	Glatz, Alexander	Au	Assess	DD 10-2368'	1984	–	I-7

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Jaffray Twp. Mellick Twp.	52E/16 SW	Bond, James	Au	Assess	BL	1984	2.7487	Z-2
	52E/16 SW	Boise Cascade	Au	Assess	BL	1984	2.7487	BB-1
Jaffray Twp.	52E/16 SW	Boise Cascade Canada Ltd.	Au	Assess	EM, Mag	1985	2.8286	BB-2
	52E/16 SW	553215 Ontario Ltd.	Au	Assess	Man	1984-85	-	CCC-1
	52E/16 SW	553215 Ontario Ltd.	Au, Ag	Assess	SA	1984-85	2.8904	CCC-2
Kawashegamuk Lake Hyndman Twp.	52F/08 NW 52F/09 SE	Boulder Mountain Resources	-	Assess	AEM, AMag	1984	2.8009	U-1
Kawashegamuk Lake	52F/08 NW	Esso Resources Canada	Au	Assess	SA	1983-84	2.7900	R-2
Kawashegamuk Lake	52F/08 NW	Esso Resources Canada	Au	Assess	DD 23-3,396′	1985	-	R-3
	52F/08 NW	Kozowy, Alexander	Au	Assess	DD 4-568.4′	1984	-	X-1
Kawashegamuk Lake Tabor Lake	52F/08 NW 52F/09 SW	Hudson Bay Exploration	-	Non Assess	DD 8-1185′, EM	1974	-	V-1
Kawashegamuk Lake Wapageisi Lake	52F/08 NW 52F/08 SW	Jalna Resources Ltd.	Au	Assess	Amag, AEM	1985	-	-
Kawashegamuk Lake	52F/08 NW	Voyager Explorations Limited	Au	Assess	BL, Geochem	1984	2.7537	T-3
	52F/08 NW	Wright, R. J.	Au	Assess	DD 1-117′	1984	-	P-4
Kirkup Twp.	52E/09 NW	Kidd Creek Mines Ltd.	Au	Assess	AMag, AEM	1984	2.7789	BBB-1
	52E/09 NW	President Mines Ltd.	Au, Ag	Assess	Cons Rpt, SA, Expend	1984	2.8413	SSS-14
Langton Twp.	52F/14 SW	Hansson, Earl	Au, Cu, Ni	Assess	SA	1984	2.7394	M-2
Laval Twp.	52F/15 SE	Glatz, Alexander	-	Assess	EM, Mag	1985	2.8193	W-1
	52F/15 SE	Glatz, Alexander	Pb,Sn,Ag,Cu	Assess	Cons Rpt	1984	2.8249	W-2
	52F/15 SE 52F/16 SW	Jalna Resources Ltd.	Au	Assess	AMag, AEM	1985	-	-
	52F/16 SW	Mistango Consolidated	Au	Assess	AEM, AMag	1984	2.7695	T-1
Lawrence Lake Tadpole Lake	52F/06 SW 52F/06 NW	Campbell Resources Inc.	Au	Assess	AMag, AEM	1984-85	2.7836	E-1
	52F/06 SW	Dejour Mines Ltd.	Au	Assess	Mag	1984	2.7505	B-2
Lawrence Lake	52F/06 SW	Dejour Mines Ltd.	Au	Assess	DD 9-4021′ BL, Geochem	1984	2.7987	B-3
Little Turtle Lake	52C/15 SE	Homestake Explorations Ltd.	Au	Assess	SA	1984	-	-
Lobstick Bay	52F/05 NW	BP Resources Canada Ltd.	Au	Assess	Geochem	1984	2.7334	N-2
	52F/05 NW	BP Resources Canada Ltd.	Au	Assess	DD 1-364′	1985	-	N-3
	52F/05 NW	BP Resources Canada Ltd.	Au	Assess	BL	1984	2.7855	N-4
	52F/05 NW	BP Resources Canada Ltd.	Au	Assess	DD 1-393′	1985	-	N-5
	52F/05 NW	BP Resources Canada Ltd.	Au	Assess	DD 2-806′	1985	-	N-6
	52F/05 NW	BP Resources Canada Ltd.	Au	Assess	EM, Mag	1985	2.8520	N-7
	52F/05 NW	Noranda Exploration Co.	Au	Assess	Mag, I,P.	1984	2.7390	M-3
	52F/05 NW	Noranda Exploration Co.	Au	Assess	SA	1984	2.7630	M-4
Long Point Island	52E/08 NE	Roberecki, Ed	Au	Assess	SA	1983	2.7195	L-2
Lower Manitou Lake	52F/07 SW	Cochrane Oil & Gas Ltd.	Au	Assess	DD 1-108′	1984	-	X-3
	52F/07 SW	Jalna Resources Ltd.	Au	Assess	AMag, AEM	1985	-	-
Lower Manitou Lake Harper Lake	52F/07 SW 52F/07 NW	St. Joe Canada Inc.	Au	Assess	Geochem	1982-83	2.8188	U-5

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lower Manitou Lake Harper Lake	52F/07 SW 52F/07 NW	St. Joe Canada Inc.	Au	Assess	DD 24-8116 Geochem	1983	2.7682	U-6
Lower Manitou Lake Harper Lake	52F/07 SW 52F/07 NW	St. Joe Canada Inc.	Au	Assess	Expend	1982-83	2.8153	U-7
Lower Manitou Lake	52F/07 SW	St. Joe Canada Inc.	Au	Assess	GL	1983	2.7833	U-4
	52F/07 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7295	W-14
	52F/07 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7410	W-15
	52F/07 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7228	W-16
Lower Manitou Lake Harper Lake	52F/07 SW 52F/07 NW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7288	W-17
Lower Manitou Lake	52F/07 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7233	W-18
	52F/07 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7292	W-19
	52F/07 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.7283	W-20
	52F/07 SW	Wright, R. J.	Au	Assess	EM, Mag	1984	2.8034	W-21
	52F/07 SW	Wright, R. J.	Au	Assess	DD 2-537'	1984	-	W-22
	52F/07 SW	Wright, R. J.	Au	Assess	DD 1-237'	1984	-	W-23
Mang Lake Lower Manitou Lake	52F/02 NW 52F/07 NW	Jalna Resources	Au	Assess	EM, Mag, I.P.	1984	2.7154	D-1
Manross Twp.	52E/09 SW	Roberecki, Ed	Au	Assess	STr	1985	-	D-3
Melgund Twp.	52F/09 SW	Glatz, A.	Au	Assess	SA	1984	2.7557	AA-3
	52F/09 SW	Glatz, A.	Au	Assess	Tr, SA	1984	-	AA-4
	52F/09 SW	Silver Lake Resources Inc.	Au	Assess	EM, Mag, GL	1984	-	BB-1
	52F/09 SW	Sulpetro Minerals Ltd.	Au	Assess	Geochem	1984	2.7787	CC-5
	52F/09 SW	Sulpetro Minerals Ltd.	Au	Assess	DD 1-357'	1985	-	CC-6
Menary Twp.	52C/13 NW	Agassiz Resources Ltd.	BM, Au	Assess	SA	1985	2.8356	D-7
Napanee Lake	52F/03 NE	Agassiz Resources Ltd.	Au, Sb	Assess	GL	1984-85	2.8456	M-1
	52F/03 NE	Noranda Exploration Company Limited	Au	Assess	SA	1984	2.7513	F-2
	52F/03 NE	Noranda Exploration Compnay Limited	Au	Assess	Mag, IP, GL	1984	2.7553	F-3
	52F/03 NE	Noranda Exploration Company Limited	Au	Assess	SA	1984	2.7647	F-4
	52F/03 NE	Silver Lake Resources Inc.	Au	Assess	EM, Mag, GL	1984	2.7802	E-1
	52F/03 NE	Silver Lake Resources Inc.	Au	Assess	EM, Mag	1984	2.7766	E-2
	52F/03 NE	Silver Lake Resources Inc.	Au	Assess	Geochem	1984	2.8246	E-3
Napanee Lake Vista Lake	52F/03 NE 52F/03 SE	Sparton Resources Inc.	Au	Assess	Expend	1984	-	K-2
Napanee Lake	52F/03 NE 52F/03 SE	Sparton Resources Inc.	Au	Assess	DD 9-2409'	1985	-	K-3
Phillips Twp.	52F/04 NW 52F/01 NE	Cymbal Explorations Inc.	Au	Assess	Geochem	1985	2.8162	U-3
	52F/04 NW	Cymbal Explorations Inc.	Au	Assess	Geochem	1985	2.8163	U-4
Phillips Twp. Dogpaw Lake	52E/08 SE 52F/05 SW	Wasabi Resources Inc.	Au	Assess	EM, AMag	1984	2.7735	E-2
Porter Inlet Bliss Lake Bad Vermilion Lake	52C/15 SE 52C/11 NE 52C/10 NE	Pitkanen, Dave	Au	Assess	AEM, Mag	1983	2.6568	B-5
Rickaby Lake	52L/11 NE	Busch, David J.	Au	Assess	EM, Mag	1984-85	2.7956	L-1

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rickaby Lake	52L/11 NE	Noranda Exploration Company Limited	Au	Assess	GL	1984	2.7951	M-1
Rowan Lake	52F/05 SE	Atikwa Resources	Au, BM	Assess	AEM, AMag	1984	2.7707	YY-2
	52F/05 SE	Bigstone Minerals Ltd.	Au	Assess	DD 12-1250'	1984	–	KKK-1
	52F/05 SE	Canolen Resources Ltd.	Au	Assess	EM, Mag	1985	2.8001	TT-2
	52F/05 SE	Cream Silver Mines Ltd.	Au	Assess	Geochem, EM, GL	1984	2.7221	DDD-1
	52F/05 SE	D. K. Platinum Corporation	Au	Assess	AEM, AMag	1984	2.7711	EEE-1
	52F/05 SE	D. K. Platinum Corporation	Au	Assess	EM, Mag, GL	1985	–	EEE-2
	52F/05 SE	Falconbridge Ltd.	Au	Assess	Geochem	1984	2.8359	MMM-1
Rowan Lake Brooks Lake	52F/05 SE 52F/04 NE	Golden Transit Resources Inc.	Au	Assess	GL	1984	2.7997	ZZ-2
Rowan Lake	52F/05 SE	Great Cameron Lake Resources	Au	Assess	GL Mapping	1984	2.7414	UU-2
Rowan Lake Atikwa Lake	52F/05 SE 52F/05 NE	Hansen, Jens E.	Au	Assess	AEM, AMag	1984-85	2.7947	HHH-1
Rowan Lake	52F/05 SE	Kriese, Karl	Au	Assess	Mag	1985	2.8338	BBB-2
	52F/05 SE	Lear Oil & Gas Ltd.	Au	Assess	EM, Mag	1984	2.7844	JJJ-1
	52F/05 SE	Loydex Resources Inc.	Au	Assess	Mag	1985	2.7810	FFF-1
	52F/05 SE	Loydex Resources Inc.	Au	Assess	EM	1985	2.8156	FFF-2
	52F/05 SE	Newfields Minerals Inc.	Au	Assess	GL, Geochem	1984-85	2.8122	LLL-1
Rowan Lake Brooks Lake	52F/05 SE 52F/04 NE	Northclaim Resources	Au	Assess	GL	1984	2.7370	WW-2
Rowan Lake	52F/05 SE	Nuinsco Resources Ltd.	Au	Assess	DD 5-2694'	1984-85	–	JJ-5
	52F/05 SE	Nuinsco Resources Ltd.	Au	Assess	GL	1983-84	2.8304	JJ-7
	52F/05 SE	Nuinsco Resources Ltd.	Au	Assess	DD 1-500'	1985	–	JJ-8
	52F/05 SE	Nuinsco Resources Ltd.	Au	Assess	DD 4-1246'	1985	–	JJ-9
	52F/05 SE	Nuinsco Resources Ltd.	Au	Assess	IP	1984	2.8303	JJ-10
	52F/05 SE	O'Donnell, John F.	Au	Assess	GL	1984	2.8416	KKK-2
	52F/05 SE	Pipe, John W.	Au	Assess	EM, Mag, GL	1984	2.7831	GGG-1
	52F/05 SE	Rosenthal, Alex	Au	Assess	SP, GL	1984	2.8332	CCC-2
	52F/05 SE	Sault Meadows Energy	Au, Ag	Assess	DD 5-2470'	1984	–	GG-3
	52F/05 SE 52F/06 SW	Sherritt Gordon Mines Ltd.	Au	Assess	GL, Geochem	1984	2.7817	KK-2
	52F/05 SE	Silver Lake Resources Inc.	Au	Assess	GL, Geochem	1984	2.7813	III-1
	52F/05 SE	Silver Lake Resources Inc.	Au	Assess	EM, Mag, IP	1984	2.7280	III-2
	52F/05 SE	Silver Lake Resources Inc.	Au	Assess	DD 3-2343'	1985	–	III-3
Sakwite Lake Mang Lake	52F/02 SW 52F/02 NW	Sennol Resources Ltd.	Au	Assess	DD 6-498.1'	1984	–	A-2
Senn Twp. Fleming Twp.	52C/13 NW 52C/13 SW	Agassiz Resources Ltd.	Au	Assess	GL	1985	2.8357	D-6
Shistose Lake	52F/04 NE	Sherritt Gordon Mines	Au	Assess	GL, Geochem	1983-84	2.6789	S-1
Shoal Lake	52E/11 SE	BP Resources Canada	Au	Assess	DD 1-150m	1984	–	P-5
Snowshoe Bay Shoal Lake	52E/11 SE 52E/10 SW	BP Resources Canada	Au	Assess	DD 7-3384'	1983-84	–	P-4

TABLE 1.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Treelined Lake	52L/08 SW	Tibbo, Harold George	Au	Assess	SA	1984	2.8015	G-1
	52L/08 SW	Tibbo, Harold George	Au	Assess	Man Work	1984	–	G-2
Turtlepond Lake	52F/10 SE	AsamEra Inc.	Au	Assess	Geochem	1983	2.6023	Z-4
	52F/10 SE	Golden Range Resources Inc.	Au	Assess	EM, Mag	1984	2.7422	BB-1
	52F/10 SE	Sovereign, William J.	Au	Assess	SA	1984	–	Y-3
	52F/10 SE	Sovereign, William J.	Au	Assess	SA	1984	2.7909	Y-4
Vista Lakes Napanee Lake	52F/03 SE 52F/03 NE	Sparton Resources Inc.	Au	Assess	EM, Mag	1985	2.8234	F-3
Wapageisi Lake	52F/08 SW	Derry, Michener & Booth	–	Non Assess	AEM, AMag, GL,DD	1970	–	C-2
Watten Twp. Halkirk Twp.	52C/11 NE 52C/10 NW	Corporation Falconbridge Copper	Zn, Cu	Assess	Expend, SA	1984-85	2.7812	PP-4
Watten Twp.	52C/11 NE	Corporation Falconbridge Copper	BM	Assess	DD 3-1920'	1985	–	PP-6
Zealand Twp.	52F/15 SE	Sanmine Explorations Inc.	W	Assess	Mech	1983	–	R-11

The majority of exploration was directed at the Kakagi-Rowan Lakes area, where activity continued to be high at Nuinsco Resources Limited's Cameron and Rowan Lake Properties. The Manitou Lakes area, scene of a major exploration push by Teck Corporation, among others, in 1984, was not as active in 1985. Other areas of activity included northern Lake of the Woods, the Straw Lake area, Eagle, Wabigoon, and Kawashegamuk Lakes, the Mine Centre area, and Bee Lake in northwestern corner of the Division (Table 1.3).

Exploration for base metals continued, notably by one company only, Corporation Falconbridge Copper, at Rainy River. Interest in platinum-group elements and chromite was noted, but no concerted exploration programs were mounted. Interest in titanium near Mine Centre continued.

GOLD

Kakagi–Rowan Lakes Area

Nuinsco Resources Limited continued to run its exploration venture at Cameron and Rowan Lakes throughout 1985. Commenced in 1981 at Cameron Lake, with a period of relative inactivity in 1982, and acquisition of its Rowan Lake Monte Cristo holdings in 1983, activity of that company precipitated a staking rush in that year. The year 1984 saw major activity on both the Cameron Lake and Rowan Lake holdings, with exploration of the new Victor zone at that time. At Cameron Lake, ore reserves were estimated to be between 1.5 and 2 million tons grading 0.15 to 0.2 ounce gold per ton.

Early in 1985, Nuinsco entered into an agreement with Echo Bay Mines Limited in which the latter was to contribute $350 000 in the purchase of shares, and to undertake to spend $1 million in 1985 on exploration, and the right to spend a further $3 million by purchase of shares. This substantial commitment of funding enabled Nuinsco to proceed with diamond drilling programs on both its Cameron Lake and Rowan Lake Properties throughout 1985. By March, the winter drill program at Rowan Lake had led to the announcement (The Northern Miner, March 28, 1985) of an intersection of 17.3 feet grading 0.37 ounce gold, including an 11-foot section grading 0.56 ounce gold, on the new Victor zone.

Echo Bay's continuing interest in the area was indicated by its entering into an agreement with Inco in exploration of the latter company's ground immediately west of Nuinsco's Cameron Lake holdings.

In May, Nuinsco announced (The Northern Miner, May 16, 1985) new calculations of reserves in the Main zone of 1 328 000 tons grading 0.16 ounce gold per ton, to a depth of 1100 feet, including a core of 900 000 tons grading 0.20 ounce per ton.

By July, 20 000 feet of new drilling on the Main zone was completed (The Northern Miner, August 22, 1985), increasing reserve calculations to 1 625 000 tons grading 0.16 ounce gold per ton, to a depth of 1100 feet, of which 1 000 000 tons grades 0.23 ounce gold per ton. An Interim Report to shareholders, issued November 29, 1985, indicates that in total 17 shallow holes were diamond drilled on the Victor zone during the 1985 season, tracing the zone from surface to a depth of about 700 feet, and indicating about 300 000 tons grading about 0.12 ounce gold.

Nuinsco's interests along the so-called Monte Cristo shear zone were increased by its entry into a joint venture with Charger Resources Limited on the latter company's ground to the west of Nuinsco's Rowan Lake holdings.

By the end of September, Echo Bay Mines Limited had made a decision to defer underground exploration on the Main zone at Cameron Lake by providing a further $1.5 million for exploration on Nuinsco property. Echo Bay also entered into an agreement with Canolan Resources Limited, on the latter company's 32-claim block situated between Cameron and Rowan Lakes.

Construction of a 12-mile long access road to Cameron Lake from Highway 71 proceeded during the late summer and fall of 1985, and was completed before year's end.

The exploration activity on properties surrounding those of Nuinsco, initiated in 1984 as a result of the staking rush of 1983 at Kakagi-Rowan Lakes, continued into 1985. Some of these properties are on strike with or closely parallel to either the Cameron Lake Property or the Monte Cristo and Victor Island Prospects of Nuinsco. In 1984, the following of these companies were particularly active (Blackburn and Hailstone 1985, p.8-9): Bigstone Minerals Limited; Charger Resources Limited; Dejour Mines Limited; Del Norte Chrome Corporation; Falcon Resources Incorported; and Canolan Resources Limited. However, exploration was continued only on the property of Del Norte Chrome in 1985, and D.K. Platinum Corporation became active in addition to those listed above.

Silver Lake Resources Incorporated, in its 50-50 joint venture with Del Norte Chrome on the latter's ground, conducted in the late winter of 1984-85, 2400 feet of diamond drilling over three holes (The Northern Miner, March 21, 1985), directed at magnetic features, beneath Sullivan Bay of Rowan Lake. Subsequent assay information (Assessment Files, Resident Geologist's Office, Kenora) indicates values in the range of trace to 0.008 ounce gold per ton were obtained. However, a number of shears were intersected that suggest the Monte Cristo-Victor Island shear zone does extend southwestward beneath the waters of Sullivan Bay.

D.K. Platinum Corporation carried out geological mapping and ground electromagnetic and magnetic surveys between May and August of 1985 over 49 claims at the eastern end of the Nolan Lake stock, subsequent to an airborne electromagnetic and magnetic survey flown late in 1984 (Assessment Files, Resident Geologist's Office, Kenora). Offset, east-trending conductors are interpreted by C.J. Kuryliw, consultant for D.K. Platinum, to represent shear zones displaced by northerly trending faults (Assessment Files, Resident Geologist's Office, Kenora, and personal communication). Mr. Kuryliw suggests these shears to be good targets for diamond drilling.

Elsewhere in the general Kakagi-Rowan Lakes greenstone belt, a number of companies continued exploration commenced in previous years. Canadian Nickel, as operator in a joint venture with Welcome North Mines Limited, diamond drilled two 1000 m long alteration zones associated with differentiated mafic to ultramafic sills at the Penn Prospect on Kakagi Lake. This was carried out as follow-up to geophysical surveys and geological mapping in 1984 (Assessment Files, Resident Geologist's Office, Kenora).

Falconbridge Limited diamond drilled four holes in 1985 at Cedartree Lake in the Dogpaw Lake area, following the drilling of 22 holes on their McLennan Prospect option from Welcome North in 1984 (R. Band, Geologist, Falconbridge, Winnipeg, personal communication, 1985).

Dubenski Gold Mines Limited continued a diamond drill program on the Caswell-Williams (or Dubenski) Prospect at Flint Lake (J.P. Sheridan, consulting engineer, personal communication, 1985).

Cymbal Explorations Incorporated carried out a basal till survey on their Young Bay gold property, Kakagi Lake, in March, 1985, as follow-up to geological and geophysical surveys performed in 1983 and 1984 (Assessment Files, Resident Geologist's Office, Kenora). This survey, drilled under Young Bay, represents one of the few basal till surveys using a sonic drill carried out in the Kenora Mining Division.

B.P. Resources Canada Limited continued work on their Lobstick Bay option from R.J. Fairservice, with ground magnetic, electromagnetic, and induced polarization surveys, and diamond drilling, reportedly one hole (Assessment Files, Resident Geologist's Office, Kenora), carried out as a follow-up to geological mapping and sampling done in 1984. This property, on the northern shore of Lobstick Bay, had previously been under option to Esso Minerals Canada. B.P. Resources Canada Limited also performed diamond drilling, reportedly two holes (Assessment Files, Resident Geologist's Office, Kenora), on their Mushkasu Lake option, also from R.J. Fairservice. This property had previously been under option to Noranda Incorporated.

Exploration was newly commenced on a number of properties in the general Kakagi-Rowan Lakes area in 1985. Fort Knox Gold Resources reported (The Northern Miner, March 28, 1985) on three diamond-drill holes at the old Virginia Mine in the Atikwa Lake area, carried out by Inco Limited as operator. Stripping and trenching were carried out over the summer, and short Winkie drillholes were used to undercut surface trenches.

New McManus Red Lake Gold Mines Limited, in a joint venture with Lodi Metals Incorporated, carried out diamond drilling at the old Regina Mine near Sioux Narrows (George Cross News Letter, April 11, 1985). Drilling was conducted both on the Regina Mine veins, and on the Neda vein.

Geophysical surveys, both airborne and on the ground, were conducted by, or on behalf of, the following companies and individuals: in the Rowan Lake area, by Great Central Mines Limited, by Lear Oil and Gas Corporation, by Loydex Resources Incorporated, by V. Regan, and by Canolan Resources Limited; in the Atikwa Lake area, by Cominco Limited; in the Dogpaw Lake area, by K. Kriese, by Proteus Resources Limited, and by Bigstone Minerals Limited; in the Heronry and Dogpaw Lakes areas, by Canadian Nickel Company Limited; in the Rowan and Atikwa Lakes areas, by J. Hansen; and in the Lawrence and Tadpole Lakes area, by Campbell Resources Incorporated.

Other work known to have been performed includes: geological surveys, in the Dogpaw Lake area by Dunfrazier Gold Exploration Incorporated and by Proteus Resources Limited, and in the Rowan Lake area by J.F. O'Donnell and by V. Regan; diamond drilling in the Rowan Lake area by Sault Meadows Energy Corporation; and work by Maybrun Mines Limited and by Voyager Explorations Limited.

Straw Lake Area

Corporation Falconbridge Copper carried out mapping, lithogeochemical and soil geochemical surveys, induced polarization and magnetic geophysical surveys, stripping and sampling and a five hole drill program on their option from R.W. Fairservice in the Bluffpoint Lake area (Assessment Files, Resident Geologist's Office, Kenora). This property has been under investigation since 1981, firstly by Selco Incorporated, secondly by Noranda Mines Limited, and since 1985 by Corporation Falconbridge Copper.

Sparton Resources Incorporated conducted an eight hole diamond drill program on their Peep and Sorry Mac claim blocks at Manitou Stretch, Napanee Lake area, as follow-up to earlier geological mapping, VLF electromagnetic and magnetic surveys, and lithogeochemical and soil geochemical surveys (Assessment Files, Resident Geologist's Office, Kenora).

Other work known to have been performed includes a geophysical survey by Black Gold Oil and Gas Limited, in the Napanee Lake area, and VLF electromagnetic, magnetic, and geologic mapping surveys, and sampling, carried out by Jack Bolen (personal communication) on his claims between Sullivan and Straw Lakes in the Bluffpoint Lake area.

Manitou–Wabigoon–Eagle Lakes Area

Following a protracted exploration program at Manitou Island, Lower Manitou Lake during 1983 and 1984, Teck Corporation was inactive on the property in 1985. However, following ground geophysical surveys performed in 1984 on their claims east of Jackfish Bay on Upper Manitou Lake, Teck conducted trenching and detailed geological mapping in the fall of 1985 (R.J. Wright, Assessment Files, Resident Geologist's Office, Kenora).

Cochrane Oil and Gas Limited conducted geological and geophysical surveys in the Lower Manitou, Harper, and Boyer Lakes areas in the early part of 1985, following extensive geophysical, geological, geochemical, and diamond drill programs in 1983 and 1984.

Jalna Resources Limited conducted airborne electromagnetic and magnetometer surveys over their 626 claim, 32 km (20 mile) long block in the general Manitou Lakes area during 1985, following extensive work on the ground commencing in 1983, with additional work in 1984. Jalna conducted an airborne geophysical survey over a newly acquired contiguous block of 33 claims, previously held by Voyager Explorations Limited, immediately south of Snake Bay of Stormy Lake, in the Kawashegamuk Lake area. Jalna also flew an airborne geophysical survey over a block of 37 contiguous claims northwest of Gardnar and Beartrack Lakes, Laval Township (Assessment Files, Resident Geologist's Office, Kenora).

June Resources Incorporated flew airborne electromagnetic and magnetometer surveys over two separate claim blocks totaling 104 claims, in the Boyer Lake and Turtlepond Lake areas (Assessment Files, Resident Geologist's Office, Kenora).

Esso Resources Canada Limited, following a diamond drill program of 23 holes totaling 1035 m (3396 feet) at 3 separate showings on their Snake Bay Prospect in the Kawashegamuk Lake area (Assessment Files, Resident Geologist's Office, Kenora), was inactive on the property during 1985.

Sulpetro Minerals Limited began a diamond drill program in late 1985 on their property north of Tabor Lake, Melgund Township. The first hole tested a mineralized quartz-porphyry dike and was drilled to a depth of 108.8 m (357 feet) (Assessment Files, Resident Geologist's Office, Kenora).

Raleigh Resources Limited diamond drilled 7 holes totaling 915 m (3001 feet) on their Fornieri Bay Property on Eagle Lake during the spring of 1985. The drilling followed self-potential geophysical surveys and an 11 hole diamond drill program in 1983 and 1984, which had outlined anomalous gold mineralization (Assessment Files, Resident Geologist's Office, Kenora).

Greenstone Resources Limited conducted ground magnetometer and VLF electromagnetic surveys over eight contiguous claims at the south end of Meridian Bay on Eagle Lake, during the early part of 1985 (Assessment Files, Resident Geologist's Office, Kenora).

Jonpol Explorations Limited, in a joint venture with Beaufield Resources, hold 113 contiguous claims in the Eagle Lake area which have a number of known gold occurrences (The Northern Miner, August 8, 1985), including the Manhattan Occurrence, conducted prospecting in 1985 (The Northern Miner, September 16, 1985) as follow-up to airborne VLF electromagnetic and magnetometer surveys performed in 1984 (Assessment Files, Resident Geologist's Office, Kenora).

Rio Algom Exploration Incorporated conducted linecutting and ground VLF electromagnetic, total field magnetometer, and horizontal loop max-min surveys on 54 contiguous claims located immediately north of the Trans-Canada Highway in central Bridges Township. Previous work on the property in 1969 by Noranda Mines Limited consisted of geophysical surveys and diamond drilling (Assessment Files, Resident Geologist's Office, Kenora).

Other companies known to have done exploration for gold in the general Manitou-Wabigoon-Eagle Lakes area in 1985 include: an airborne geophysical survey by Beved Resources Incorporated in the Boyer Lake area; a geological survey by Billiton Canada Limited in Laval Township; geological and geophysical surveys done by Gold Washe Limited in the Boyer Lake area; a geophysical survey by Green River Resources Limited in the Turtlepond Lake area; a geophysical survey done by E.M. Hall in the Boyer Lake area; stripping, sampling, and geologic mapping by Kidd Creek Mines Limited in the Contact Bay area; airborne geophysical surveys by Marge Enterprises Limited in the Turtlepond Lake area; airborne geophysical surveys by Marlet Resources Limited in the Boyer Lake area; and an airborne geophysical survey done by Voyager Explorations Limited over ground under option from A. Kozowy in the Wapageisi Lake area.

Lake of the Woods–Shoal Lake Area

Following detailed mapping, geochemical, and geophysical surveys, and surface stripping on Boise Cascade Canada's wholly-owned Scramble Prospect and adjacent unpatented claims, all in Jaffray Township, in 1984, Kennco Explorations entered into an option agreement with the property owner in 1985. Diamond drilling was carried out on the zone containing the Scramble Prospect.

Homestake Mineral Development commissioned an airborne magnetic gradiometer and VLF electromagnetic survey, flown in April 1985, along the east-trending Crow Duck Lake-Rush Bay lineament, northern Lake of the Woods. The area covered is approximately 40 km (25 miles) long by 3 km (2 miles) wide, and an additional contiguous 23-claim block over the eastern end of the Canoe Lake Stock, under option from M.S. Morrison (Assessment Files, Resident Geologist's Office, Kenora). Subsequent reconnaissance geological mapping was carried out over the area in the summer of 1985, and special attention paid to the Nor-Penn Occurrence in the Clearwater Bay area, under option from Academy Explorations Limited.

Kenora Prospectors and Miners, a company that holds patented ground in the Shoal Lake area which includes the past-producing Mikado and Cedar Island (Cornucopia) Mines among other gold prospects, announced in November (The Northern Miner, November 4, 1985) that St. Joe Canada Incorporated had entered into an agreement whereby the latter company, by spending $2.45 million on exploration over the next 4 years, and making cash payments, can earn a 50% interest. Geological work had previously been carried out on Kenora Prospectors and Miners' ground over the summer months.

Exploration commenced in 1983 by Barrier Reef Resources Limited, on a property near High Lake held under option by its subsidiary company Falcon Resources Limited, was continued in 1985. The earlier work consisted of geological, geophysical, and geochemical surveys in 1983 and 1984. The property includes the Electrum Prospect, held under lease by R. Longe. In 1985, work consisted of magnetometer and VLF electromagnetic surveys conducted on one claim only, in the name of Gladys Anne Stephens, over the western end of Electrum Lake.

Mistango Consolidated Resources Limited announced (The Northern Miner, September 16, 1985) that a 3000-foot drill program was scheduled near the former Triggs Mine Prospect in Code Township, and that drilling would also be carried out on a nearby property close to Witch Bay. C. Kuryliw, consultant on the project (personal communication, 1985) confirmed that 3091 feet of diamond drilling was carried out over eight holes, four on the Triggs Prospect, and four on the Witch Bay Property, which he interprets to be the along-strike extension of the Wendigo Mine vein.

Other gold exploration known to have been carried out in the Lake of the Woods-Shoal Lake area in 1985 included: a geological survey by D. Busch in Ewart Township; stripping, and geological and geophysical surveys in the name of G. Clark in Haycock Township; geological and geophysical surveys by J. Hansen in Glass Township; geological and geophysical surveys by W.C. Hood in Kirkup Township; geological and geophysical surveys by W.T. Knox in Code Township; manual work by E. Roberecki in the Bigstone Bay area and in Manross Township; manual work by 553215 Ontario Limited in Jaffray Township; and work by Kidd Creek Mines Limited.

Mine Centre Area

Cleyo Resources Incorporated, under an option agreement with P.I.R.P. Holdings Incorporated, continued an exploration program commenced in 1984 on the Golden Star, Isabella and other occurrences, all south of Mine Centre in the Bad Vermilion Lake area. David R. Bell Geological Services Incorporated, as consultants, carried out a geological, geophysical, stripping, sampling, and diamond drill program (S. Ciglen, Cleyo Resources, personal communication, 1985).

Corporation Falconbridge Copper conducted a stripping, sampling, and a 400 m drill program on the McKenzie Gray Property, optioned from S. Lakatos and K. McTavish in the Bad Vermilion Lake area (G. Riverin, Corporation Falconbridge Copper, personal communication, 1985).

Sparton Resources Incorporated and Lynx-Canada Explorations Limited, in a 50-50 joint venture, carried out approximately 1500 feet of diamond drilling over four holes, all on patented claims and approximately 300 m west of the Independence Mine in the Bennett Lake area (R. Crowley, Spartan Resources, personal communication, 1985).

Homestake Explorations Limited, a Harbinson Group company, following diamond drilling on their Olive Mine prospect in 1984, announced in 1985 (The Northern Miner, July 18, 1985) that they had oulined 21 000 tons of proven and probable reserves grading 0.24 ounce gold per ton, and another 2300 tons at 0.16 ounce gold per ton, all to a depth of 300 feet, and within the old mine workings. Work in 1985 consisted of a geological mapping and sampling program on Harbinson Group's Stellar and Barber Lake Properties in the Bad Vermilion Lake area.

Other activity known to have been carried out for gold near to Mine Centre during 1985 included: stripping and mechanical work by D. Kroocmo in the Factor Lake area, and a magnetometer survey by J.W. Redden in the Bennett Lake area.

The majority of exploration for gold in the general Fort Frances area was carried out near to Mine Centre. However, one program was carried out northwest of Fort Frances, where Agassiz Resources Limited conducted VLF electromagnetic and magnetic surveys, and geological and sampling programs in the Menary Township and Beadle Lake areas (Assessment Files, Resident Geologist's Office, Kenora).

Bee Lake Area

Following acquisition of a large block of claims adjacent to the Ontario-Manitoba border in 1984, and subsequent prospecting and reconnaissance geological mapping, Maralgo Mines Limited were inactive in the area in 1985. Also in 1984, Noranda Exploration Company Limited had conducted geological and humus geochemical surveys in the vicinity of Anderson, Odd, and Rickaby Lakes (Assessment Files, Resident Geologist's Office, Kenora), but no further work was carried out in 1985.

A group called the Bee Lake Syndicate, in the name of David J. Busch, conducted magnetometer and VLF electromagnetic surveys over the former Mamen Group (or Bee Lake Mines Limited) claims, between Rickaby and Bee Lake (Assessment Files, Resident Geologist's Office, Kenora). Gold is associated with magnetite iron formation on this property.

BASE METALS

The regional exploration program conducted by Noranda Exploration Company Limited within the English River Subprovince, between Highway 105 and the Ontario-Manitoba border, since about 1980, was inactive in 1985. Subsequent to ground work on claims in the vicinity of Oak Lake in 1984, conducted as follow-up to regional airborne geophysical surveys, most of these holdings have subsequently been allowed to lapse. At the present time, Noranda holds only a few small isolated claim blocks in that portion of the English River Subprovince within Kenora Mining Division that was covered by the airborne survey.

Corporation Falconbridge Copper continued their base metal exploration program commenced in 1984 east of Fort Frances. Geological mapping, lithogeochemical and geophysical surveys, and a diamond drill program were all conducted on a large block of claims between Windy Point, south of Swell Bay, and Lochart Lake, situated in Halkirk and Farrington Townships (G. Riverin, Corporation Falconbridge Copper, personal communication, 1985).

Exploration for zinc mineralization, conducted in 1983 and 1984, by Agassiz Resources Limited near Burditt Lake northwest of Fort Frances in Senn and Menary Townships (Assessment Files, Resident Geologist's Office, Kenora) was not continued in 1985; instead, Agassiz's attention turned to gold in the same area, at Off Lake (*see* "Mine Centre Area").

A. Glatz conducted ground magnetometer and VLF electromagnetic surveys over his lead-copper-zinc property south of Rafter Lake in Laval Township east of Dryden, following previous geological work done in 1984 (Assessment Files, Resident Geologist's Office, Kenora).

Sparton Resources Incorporated conducted a geological survey over a zinc-gold occurrence at the east end of Umfreville Lake, in the Paterson Lake area. Known as the Oneman Lake Occurrence, the former name of Umfreville Lake, a previous report on the property was prepared in 1948 by Robert Thomson, then Resident Geologist, Kenora (Assessment Files, Resident Geologist's Office, Kenora).

OTHER MINERALS

Titan Titanium International, a subsidiary of Barron Hunter Hargrave, has outlined from drilling conducted on its Bad Vermilion Lake titanium property prior to 1985, a total indicated reserve of 1 270 000 tons grading 15% titanium dioxide and 45% iron, according to an announcement in the Northern Miner, June 27, 1985. According to the same article, mineralization has been traced to 200 feet depth, and still open below that. The company also maintains (The Northern Miner, August 15, 1985) that without further exploration the property has potential for 177 800 tons of titanium sponge. During 1985, 13 holes totaling 4174 feet, were diamond drilled, and magnetic geophysical surveys carried out on the property (J. Londry, consultant geologist, personal communication, 1985). Of the block of 45 claims, 24 had been brought to lease at time of writing.

Agassiz Resources Limited conducted geological mapping and sampling at a stibnite occurrence at Manitou Stretch, in the Napanee Lake area, initially discovered in the early 1940s by F. Austin. Its gold potential was investigated by Noranda Exploration Company Limited in 1984. The current work appears to indicate that it is primarily an antimony occurrence, with grab samples assaying up to 20 000 ppm antimony (Assessment Files, Resident Geologist's Office, Kenora).

L. Cousineau carried out a stripping program on his Bears Passage molybdenum property in Halkirk Township in 1985.

PROPERTY EXAMINATIONS

In 1985, the following mining and exploration properties, and mineral occurrences and prospects were examined by staff of the Kenora Resident Geologist's office as part of the regular program.

GOLD:

1. Cameron Lake, Monte Cristo, and Victor Island Prospects-Rowan Lake area
2. Combined Prospect, Phillips Township
3. Cornucopia (Cedar Island) Mine, Glass Township
4. Edwards-Fairservice Prospect, Bluffpoint Lake area
5. Electrum Lake Prospect, Ewart Township
6. Golden Star Mine and Isabella Prospect, Bad Vermilion Lake area
7. Gold Hill, Black Jack, and Golden Gate Prospects, Kirkup Township
8. Gold Washe Limited claims, Boyer Lake area
9. Kozowy Flambeau Lake Prospect, Aubrey and Van Horne Townships
10. Lynx-Canada Explorations Limited-Sparton Resources Incorporated claims, Bennett Lake area
11. Mamen Prospect, Rickaby Lake area
12. McKenzie Gray Occurrence, Bad Vermilion Lake area
13. Neda and Abraham Occurrences, Willingdon Township
14. Nor-Penn Occurrence, Clearwater Bay area
15. Ontario Gold Concessions Limited Occurrence, Shoal Lake area
16. Page Occurrence, Forgie Township
17. Pine Portage Prospect, Kirkup Township
18. Scramble Prospect, Jaffray Township
19. Sheridan claims, Atikwa Lake area
20. Sparton Resources Incorporated claims, Napanee Lake area
21. Sutherland Group Occurrence, Bennett Lake area
22. Thrasher Prospect, Lobstick Bay area
23. Treasure and Silverman Occurrences, Jaffray and Haycock Townships
24. Virginia Prospect, Atikwa Lake area

MOLYBDENUM-GOLD:

25. McNamara Lake Occurrences, McNamara Lake area

COPPER:

26. High Lake Porphyry Copper Zone, Ewart Township

DRYDEN–IGNACE ECONOMIC GEOLOGIST PROGRAM

INTRODUCTION

The Dryden-Ignace Economic Geologist Program, initiated in 1984, continued during 1985 with funding from the Ministry of Northern Development and Mines. The program encompasses an area from Eagle Lake east to Ignace, north to Vermilion Bay, and south to Lower Manitou Lake. The objective of the program is to encourage and promote mineral exploration in this general area by providing assistance and advice to prospectors and mining companies, assisting anyone who wants to start prospecting, facilitating contact between prospectors and the mining industry, monitoring local exploration activities, and establishing a data base by documenting and investigating old and new mineral occurrences.

At the beginning of the year a 10-week, 30-hour, basic prospecting course and subsequent field trip in the Dryden area was presented free of charge in Dryden. Average attendance of 60 people was maintained throughout the duration of the course. In addition, a mapping project was begun in the Flambeau Lake-Larson Bay area, immediately west of Wabigoon Lake.

During 1985, exploration was directed toward gold. A brief history of exploration for this commodity in the Dryden area was presented in the 1984 report of activities (Parker 1985).

PROPERTY EXAMINATIONS

In 1985, the following mineral occurrences, prospects, past-producing mines, and mining and exploration properties were examined.

GOLD:

1. Alto-Gardner Prospect, MacFie Township
2. Baden-Powell Mine, Buchan Bay area
3. Big Master Mine, Boyer Lake area
4. Bonanza Mine, Van Horne Township
5. Butler Lake Occurrence, Butler Lake area
6. Buffalo Occurrence, Garnet Bay area
7. Church Lake Prospect, Kawashegamuk Lake area
8. Drake Prospect, Van Horne Township
9. East Zone, Kozowy, A., Flambeau Lake Prospect, Aubrey Township, Van Horne Township
10. Eldorado Prospect, Garnet Bay area
11. Elora Mine, Boyer Lake area
12. Fornieri Bay Prospect, Buchan Bay area
13. Frenchman Island Occurrences, Harper Lake area
14. Fuchsite Zone Occurrence, Harper Lake area
15. Glatz, A., Pritchard Lake Occurrence, Van Horne Township
16. Golden Moose Occurrence, Van Horne Township
17. Golden Eagle Prospect, Garnet Bay area
18. Good Luck Prospect, Van Horne Township
19. Grace Prospect, Garnet Bay area
20. Ideal Prospect, Van Horne Township
21. Laurentian Mine, Boyer Lake area
22. League Prospect, Van Horne Township
23. Little Jumbo Prospect, Van Horne Township
24. Lone Pine Prospect, Aubrey Township
25. Lost Prospect, Van Horne Township
26. Lunch Box Bay Zone Occurrence, Boyer Lake area
27. Manhattan Occurrence, Buchan Bay area

28. McEdna Prospect, Boyer Lake area
29. New Brown Lake Occurrence, Tabor Lake area
30. New Church Lake Occurrence, Kawashegamuk Lake area
31. New East Zone, Kozowy, A., Flambeau Lake Prospect, Aubrey Township-Van Horne Township
32. New Klondike Prospect, Melgund Township
33. Niemi Occurrence, Southworth Township
34. North Twin Island Occurrence, Garnet Bay area
35. Oxford Prospect, Boyer Lake area
36. Paymaster Prospect, Boyer Lake area
37. Peninsula Zone Occurrence, Harper Lake area
38. Pidgeon-Wabigoon Lake Occurrence, Butler Lake area
39. Pioneer Island Prospect, Garnet Bay area
40. Redeemer Mine, Van Horne Township
41. Ryan Occurrence, McNamara Lake area
42. Sakoose Mine, Tabor Lake area
43. Selby Lake Prospect, Boyer Lake area
44. S.V. 372 Occurrence, Van Horne Township
45. Trafalgar Bay Zone Occurrence, Boyer Lake area
46. Vanlas Prospect, Van Horne Township
47. Viking Prospect, Garnet Bay area
48. W.W. Smith Occurrence, Buchan Bay area
49. West Zone, Kozowy, A., Flambeau Lake Prospect, Aubrey Township

INDUSTRIAL MINERALS:

50. Nelson Granite Quarry, Docker Township

MOLYBDENUM:

51. Wilkinson, D., Occurrence, Dewan Township

PROPERTY DESCRIPTIONS

The following are descriptions of a number of properties that were visited during 1985.

Butler Lake Gold Occurrence

The Butler Lake Occurrence is located on the northern shore of the western half of Butler Lake, immediately south of Wabigoon Lake, approximately 13 km southeast of Dryden. The occurrence is situated along the southern boundary of Butler Lake Provincial Park, in an area that has not recently been explored for gold. The occurrence was rediscovered by Stan and Sherridon Johnson this past summer.

Thomson (1917) briefly described the occurrence as: "two small shafts, . . . the first on a tangle of quartz stringers containing pyrite, ankerite, tourmaline, chalcopyrite and malachite, the second on a quartz vein 4 feet wide, containing the same vein material as at the first shaft. The country rock at the latter is felsite schist striking about northwest . . . ."

The author found the occurrence to consist of eight large test pits and several trenches trending in a general northwestern direction. Two of the pits appear to be shallow shafts (10 m) with fairly large rock dumps beside them. The country rocks consist of fine- to medium-grained, chloritic, carbonatized, massive mafic flows and mafic to intermediate tuffs. The metavolcanics commonly contain 1% to 5% disseminated euhedral pyrite, show a weak to intense foliation striking 320°, and are variably altered and bleached pale green-grey by silicification. The metavolcanics are intruded by single quartz-carbonate veins and stringers, stockworks of veins, and sinuous masses and clots of quartz-carbonate. The veins strike between 065° to 154°, commonly dip south and southwest, and are composed of milk white and sugary grey quartz hosting variable amounts of buff-brown to orange iron carbonate, calcite, very abundant massive black tourmaline, <1% to 2% disseminated euhedral pyrite, ≤3% irregular blebs of chalcopyrite, and ≤1% blebs of sphalerite. At one pit there is a wide breccia zone (6 m), where angular, altered, and pyritic fragments of metavolcanics are cemented by quartz-carbonate-tourmaline. The wallrocks in the trenches are intensely sheared, sericitized (fuchsite), altered by iron carbonate, and contain very abundant disseminated pyrite (up to 10%). Although the author did not observe visible gold at the occurrence, Mr. Johnson panned some good gold tails from sulphide-rich samples. The best assays from grab samples randomly taken from various quartz veins in the trenches and pits, by the author, were 100 ppb Au, 830 ppb Au, 2510 ppb Au, 4590 ppb Au, 8420 ppb Au, 0.31 ounce gold per ton and 1.6 ounces gold per ton, with a zinc assay of 2270 ppm, copper assays ranging from 415 ppm to 8760 ppm, and silver assays ranging from <2 ppm to 16 ppm (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Pidgeon–Wabigoon Lake Gold Occurrence

The Pidgeon-Wabigoon Lake Gold Occurrence (also known as the I.R. 27 Occurrence) is located on claim K824976 (previously K13698) on the western shore of the extreme southeast bay of Wabigoon Lake, at the northwestern corner of Indian Reserve No. 27.

It is situated approximately 5.2 km southeast of the Butler Lake Gold Occurrence.

The occurrence was discovered by Mr. G.L. Pidgeon in 1950, who stripped, trenched, sampled, and diamond drilled three short holes totaling 53.6 m (176 feet). One hole intersected mineralized quartz between 0.3 m to 3.0 m (1 to 10 feet), assaying up to 0.19 ounce gold per ton, with a second intersection of mineralized quartz and host rock between 12.8 m and 18.3 m (42 to 60 feet) assaying up to 0.29 ounce gold per ton. The occurrence is presently held by Mr. R. Fairservice who staked the ground in 1980, and optioned to Royex Sturgex Mining Limited, who conducted horizontal loop EM and magnetometer surveys over the property in 1983. The surveys outlined two EM conductors, one of which flanks a magnetic anomaly with an arcuate form (Assessment Files, Resident Geologist's Office, Kenora).

The property consists of sheared, massive, pillowed and brecciated, fine-grained mafic flows intruded by irregular stockworks of quartz-iron carbonate stringers and veins. The metavolcanics contain 2% to 10% disseminated euhedral pyrite and are variably altered by iron carbonate, chlorite, and sericite. The wallrocks are commonly silicified, bleached pale green to buff brown, and contain abundant pyrite and fuchsite. The metavolcanics are sheared in two directions, a strong shear striking 014° and dipping 37°E, intersected by an east-trending shear. The quartz veins crosscut the shearing at all angles, and are composed of vitreous white quartz, extremely abundant black tourmaline, pale brown and orange iron carbonate, calcite, and ≤3%, fine grained, disseminated pyrite. The pyrite is associated with iron carbonate or angular fragments of brecciated host rock within the quartz veins. The author observed small flakes and blebs of visible gold intimately associated with pyrite, in the host rock, along the edge of a quartz vein. Arsenopyrite has also been found at the occurrence (R. Fairservice, prospector, Kenora, personal communication, 1985) but none was observed by the author. Random grab samples of the altered, pyritic, mafic metavolcanics, taken by the author, assayed 300 ppb Au, 210 ppb Au, and 605 ppb Au with arsenic assays of 80 ppm, 185 ppm, and 42 ppm respectively. Grab samples taken from some of the quartz veins by the author assayed 120 ppb Au and 2050 ppb Au, with arsenic assays of 30 ppm and 290 ppm respectively. (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The surrounding geology of the Wabigoon Lake-Butler Lake area, where the Butler Lake and Pidgeon Gold Occurrences are situated, consists of lenticular masses of felsic flows and agglomerates, some of which may be intrusive, intercalated with intermediate to mafic flows and agglomerates with very widespread, but selective, iron carbonate alteration. The felsic rocks are commonly fractured and altered to carbonate-sericite schist (Satterly 1943). Reconnaissance work in the area, by the author, revealed that the mafic and felsic rocks are commonly sheared, pyritic, carbonatized, and intruded by numerous quartz-carbonate-tourmaline veins.

Asarco Exploration (in 1970-71) and Sherritt Gordon Mines Limited (in 1979) conducted base metal exploration programs in the area (Assessment Files, Resident Geologist's Office, Kenora), but it has never been seriously evaluated for its gold potential.

The above observations suggest that in the Wabigoon Lake-Butler Lake area, gold mineralization is associated with quartz-carbonate-tourmaline veins and stockworks hosted by intensely sheared, pyritic, and carbonatized mafic metavolcanics. The carbonate-sericite schists described by Satterly (1943) may also be good hosts for quartz veins and sulphide mineralization associated with gold.

NEW CHURCH LAKE GOLD OCCURRENCE

The New Church Lake Gold Occurrence is located on claim K590337, immediately northeast of Church Lake, approximately 46.7 km southeast of Dryden, in the Kawashegamuk Lake area.

The occurrence is situated in an area known as the "New Klondike" which was explored for gold from the early 1900s to the late 1950s, when numerous gold occurrences were discovered north of Church Lake, including the Sakoose Mine and the Tabor Lake Prospect. During the 1960s and 1970s, several exploration companies conducted base metal exploration programs in the area without success. Gold exploration was renewed in the area in the early 1980s. At that time, Mr. A. Kozowy optioned a gold occurrence he had staked on the southeast shore of Church Lake to Teck Explorations Limited, who conducted geological mapping, VLF-EM surveys, magnetometer surveys, and diamond drilling on the property during 1983 and 1984 (Assessment Files, Resident Geologist's Office, Kenora). The occurrence consists of a single, narrow, high-grade quartz vein within a sheared, chloritic, and carbonatized magnetite-bearing gabbro. The property was returned to Mr. Kozowy when Teck subsequently dropped the option. Mr. Kozowy did more intensive prospecting in the area, this past summer, which led to the discovery of the New Church Lake Occurrence, about 400 m northwest of the old occurrence.

The general geological setting of the area consists of mafic flows and pyroclastics intercalated with intermediate and felsic flows and pyroclastics. These rocks have been intruded by numerous magnetite-bearing gabbros and small felsic intrusions which are commonly carbonatized and sericitized (Kresz *et al.* 1982). Pervasive carbonatization occurs throughout the area, as well as numerous northeasterly trending faults and northwesterly trending shear zones.

The New Church Lake Occurrence consists of a massive, medium- to coarse-grained, commonly porphyritic, dark green gabbro, containing very abundant (≤5%) disseminated, euhedral magnetite crystals (≤1 to 3 mm). A wide, vertically dipping shear zone striking 340° extends for approximately 1.6 km through the gabbro, along the northeastern shore of Church Lake, and along the western shore of Brown Lake, immediately north of Church Lake. The gabbro is moderately to intensely sheared, chloritized and carbonatized, hosting quartz stringers, veins, and variable amounts of disseminated pyrite (up to 2%). Xenoliths of gabbro in the quartz veins, and sheared gabbro adjacent to the veins is very soft, chloritic, pyritic (<1% to 2%), and intensely carbonatized with white-brown calcite and minor iron carbonate. The gabbro hosts a 1.5 to 2.1 m (5 to 7 feet) wide quartz vein composed of vitreous, white quartz, containing finely disseminated galena (1%), minor chalcopyrite (<1%) and pyrite (<1%). The author observed very fine blebs of pale yellow visible gold disseminated amongst the sulphide minerals and in massive quartz. A random grab sample of the vein taken by Mr. A. Kozowy assayed 33.68 ounces gold per ton (A. Kozowy, personal communication, 1985). Two grab samples of altered gabbro containing <1% pyrite, taken by the author, assayed 4 ppb Au and 90 ppb Au (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The shear zone extends a few hundred metres northwestward along a steep, sheared cliff face where large boulders, at the bottom of the cliff, contain quartz vein material and intensely sheared gabbro altered by iron carbonate. Three old east-trending trenches at the extreme northern end of the cliff, crosscut a wide felsite dike intruding the sheared gabbro. The dike is buff-white to pink, intensely carbonatized, silicified, and pyritic (≤1%), containing abundant fuchsite and hosting numerous quartz veins which have filled fractures within the felsite. The veins are composed of white quartz hosting minor amounts of disseminated pyrite, chalcopyrite, and galena. A grab sample of the felsite dike, taken by Mr. Kozowy assayed 0.16 ounce gold per ton (A. Kozowy, personal communication), and a grab sample from another location in the felsite, taken by the author, assayed 11 ppb Au and <2 ppm Ag (Geoscience Laboratories, Ontario Geological Survey, Toronto). The felsite dike and shear zone can be traced along the southern and western shore of Brown Lake. Two old, long, east-trending trenches on the western shore of Brown Lake crosscut sheared and altered gabbro intruded by the felsite dike which hosts thin, milk white quartz veins. Shearing remains intense, but alteration is less extensive and sulphide mineralization is not abundant. Random grab samples of the felsite and gabbro, taken by the author, assayed 5 and 7 ppb Au, respectively (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Although gold mineralization is erratic along the shear zone, the area warrants more exploration, both to delineate the extent of mineralization, and to search for new gold occurrences which may be associated with other sheared gabbros hosting quartz veins and fractured felsic dikes.

Eagle Lake Gold Occurrences

There are fifteen known gold properties at Eagle Lake, situated approximately 20 km west of Dryden, that include one past producer, the Baden Powell Mine, seven prospects, and seven occurrences. Half of the properties are situated in the southwestern corner of Eagle Lake in the Eldorado Bay-South Twin Island area where intermediate and mafic metavolcanics are in contact with the Atikwa Batholith. The remainder of the properties occur within intermediate and felsic metavolcanics in the Fornieri Bay-Buchan Bay area, with the exceptions of the Lone Pine Prospect, 3.2 km east of Eagle Lake, and the Swanson Occurrence situated on the northern shore of Eagle Lake. The general characteristics of each gold property are summarized in Table 1.5. Gold exploration in the Eagle Lake area began in the early 1900s and continued until the 1940s. Many of the properties were exploited for their narrow, high grade quartz veins: for example, the Baden Powell Mine, which produced 288 ounces gold and 5 ounces silver between 1902 and 1905, had an average grade of 1.77 ounces gold per ton (Ontario Ministry of Natural Resources, Production Statistical Files, Toronto). Other properties such as the Buffalo, Eldorado, Grace, Golden Eagle, and Viking produced only minimal amounts of gold. A number of mining companies are presently conducting exploration programs in the Eagle Lake area and re-evaluating the old gold properties.

The Eagle Lake area is underlain by mafic metavolcanic flows intercalated with intermediate flows and agglomerates and felsic flows and intrusives, which are bounded by the Atikwa Batholith to the south and by clastic metasediments and derived migmatites of the English River Subprovince to the north. The Wabigoon Fault extends along the contact between the metasediments and metavolcanics. Moorhouse (1941) mapped a broad northeastward trending syncline, the axis of which extends through the metasediments immediately north of Eagle Lake. Blackburn (1981) recognized a number of northeast-trending synclinal fold axes and a northeast-trending anticlinal fold axis plunging southwestward in the Buchan Bay-Froghead Bay area. Moorhouse (1941) also recognized that the metavolcanics throughout the area were sheared or well foliated and variably carbonatized, especially the felsic and intermediate rocks which extend east from Fornieri Bay.

The gold occurrences in the Eagle Lake area can be divided into four types: 1) shear zones in granitic rocks hosting quartz veins, 2) sulphide-rich, silicified shear zones, 3) shear zones in metavolcanics hosting quartz veins, and 4) shear zones in mafic intrusive rocks hosting quartz veins. These four types are described below.

1. Shear Zones in Granitic Rocks The majority of gold properties in the Eagle Lake area, such as the Baden Powell Mine, Buffalo Occurrence, Eldorado Prospect, Golden Eagle Prospect, Grace Prospect, North Twin Island Occurrence, and Viking Prospect, located in the Eldorado Bay-South Twin Island area, consist of narrow mineralized quartz veins hosted by shear zones along the northern contact of the Atikwa Batholith, where it commonly contains xenoliths of mafic metavolcanics.

Locally, the host rock is pink to grey, medium- to coarse-grained, chloritic, biotite-hornblende granite which is commonly mylonitized and appears porphyritic, due to the presence of numerous, elliptical, blue quartz eyes, <1 mm to 3 mm in size. Shear zones are typically narrow and trend in northeast, northwest, and east-west directions. The shears host narrow quartz and quartz-iron carbonate veins and stringers which contain <1% finely disseminated euhedral pyrite, chlorite, and minor specular hematite. Wallrock alteration consists of chloritization, sericitization, variable carbonatization, pyritization, and some silicification. At the Grace Prospect, small amounts of epidote occur in the wallrocks and <1% disseminated molybdenite was found in the sheared granite at the Viking Prospect. Xenoliths of metavolcanics occur at the Grace and Viking Prospects and at the North Twin Island Occurrence. At the Grace Prospect the xenolith is 60 m long and 4.5 m wide, composed of an intensely sheared, porphyritic mafic flow intruded by narrow, pink, aplite dikes and quartz veins, which also occur along the sheared contact of the xenolith. At the Viking Prospect the xenolith is intensely sheared, 0.6 m wide and 7.5 m long, composed of a massive mafic flow intruded by quartz veins which also occur along its sheared contact. In both cases the xenoliths contain very abundant biotite retrograded to chlorite. At the North Twin Island Occurrence, narrow quartz veins and stringers containing large blebs of pyrite and chalcopyrite are situated within shear zones in the granite and along the contacts of the intermediate to mafic metavolcanic xenoliths.

Grab samples of the quartz veins and wallrock were taken at each gold property, by the author, but all samples assayed trace amounts of gold, except

TABLE 1.5 CHARACTERISTICS OF GOLD PROPERTIES IN THE EAGLE LAKE AREA

Name	Location	Host Lithology	Major (Regional) Structures	Local Structures	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
Baden-Powell Mine	South Twin Island. Pat. Claim F.M. 168	Medium to coarse grained, massive, buff grey granitic rock with large clots of carbonate and chloritized biotite.	South of a northeast-trending syncline	Narrow linear shear zone striking 150/90	A simple 0.45-1.5 m wide quartz vein hosting <1% finely disseminated pyrite.	pyrite chlorite hematite	chloritization carbonatization sericitization	Atikwa Batholith, minor feldspar porphyry dike
Buffalo Occurrence	West shore of Eagle Lake, west of Prendible Island. Formerly Pat. Claim M.H. 246	Mylonitized, massive pink, biotite-hornblende granite with numerous large blue quartz "eyes".	Northeast-trending shear zone.	Narrow, linear shear zone striking northeast	<1% finely disseminated pyrite witnin narrow quartz-iron carbonate veins in schistose shear zone.	Fe-carbonate pyrite chlorite	sericitization Fe-carbonatization chloritization	Atikwa Batholith
Eldorado Prospect	North shore of Eldorado Bay. Formerly Pat. Claim M.H. 338	Mylonitized, grey, biotite-hornblende granite with numerous large blue quartz "eyes".	On strike with major northeast-trending shear zone.	1.4 m wide linear shear zone striking $080^\circ/74^\circ$N for almost 152 m.	Schistose shear zone hosting 1 m wide stockwork of quartz-iron carbonate veins and stringers containing <1% disseminated pyrite.	Fe-carbonate pyrite chlorite	sericitization Fe-carbonatization chloritization silicification	Atikwa Batholith
Fornieri Bay Prospect	Southeast shore of Fornieri Bay Claim K841884	Rhyolitic feldspar porphyry flows intruded by quartz prophyry dikes. Rocks contain <1-5% disseminated sulphides.	South limb of northeast-trending syncline. Major east-trending shear zone north of occurrence.	Northeast and east-trending shear and fracture zones.	Fractured quartz porphyry and sheared and fractured feldspar porphyry host narrow quartz veins and stringers containing <1% disseminated sulphides.	pyrite pyrrhotite chalcopyrite chlorite bismuthinite(?)	silicification chloritization carbonatization sulphidation	Quartz porphyry dikes

TABLE 1.5 Continued

Name	Location	Host Lithology	Major (Regional) Structures	Local Structures	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
Golden Eagle Prospect	West shore of Prendible Island. Formerly Pat. Claim McA.282	Coarse to medium grained, mylonitized grey, biotite-hornblende granite with numerous large blue quartz "eyes".	East of northeast-trending shear zone	0.6-1.2 m wide northwest-trending shear zone.	Shear zone hosts 0.3-0.6 m wide quartz vein containing xenoliths of granite and chlorite associated with ≤1% disseminated pyrite. Vein strikes 155°-170°/90°.	pyrtie chlorite	chloritization sericitization carbonatization pyritizatin	Atikwa Batholith
Grace Prospect	West shore of Eagle Lake, south of Pioneer Island. Formerly Pat. Claim M.H. 251	Massive, sheared, coarse-grained, grey, biotite-hornblende granite hosting a large xenolith ot porphyritic mafic flow metamorphosed to lower amphibolite grade.	Northeast-trending shear zone east of the prospect.	0.9-1.3 m side parallel shear zones striking 022°-028°/74N	Shear zones hosting thin, irregular, quartz-iron carbonate-chlorite veins and stringers with <1% disseminated pyrite.	pyrite chlorite Fe-carbonate galena sphalerite epidote	carbonatization sericitization pyritization epidotization	Aplite dikes striking 057°
Harrison, J., Occurrence	Small peninsula north of Meridian Bay Claim K79453	Massive and pillowed mafic flows	Northeast-trending syncline to the north	Two subparallel north-trending shear zones 0.9 m and 6.0 m wide, crosscut by east-trending 2.0 m wide shear zone.	Shear zones host narrow quartz-iron carbonate-tourmaline veins containing up to 5% disseminated pyrite and chalcopyrite	pyrite chalcopyrite Fe-carbonate chlorite tourmaline malachite	chloritization carbonatization sericitization silicification	None

TABLE 1.5 Continued

Name	Location	Host Lithology	Major (Regional) Structures	Local Structures	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
Lone Pine Prospect	3.2 km East of Spring Bay of Eagle Lake. Formerly Pat. Claim R.L.33	Massive, magnetite-bearing mafic vesicular flows and tuffs with thin layers of cherty interflow sediments.	Northeast-trending syncline and northwest-trending anticline.	15 m wide shear zone striking 084°/80°N.	Shear zone hosting a single 0.3-0.46 m wide quartz-iron carbonate-tourmaline vein which pinches and swells along its dip and contains 1-2% disseminated pyrite.	pyrite Fe-carbonate tourmaline chlorite	carbonatization chloritization Fe-carbonatization	None
Manhattan Occurrence	Peninsula north of Buchan Bay. Claim K677922	Seriticized and carbonatized felsic and intermediate flows and pyroclastic rocks intruded by a small magnetite-bearing, sheared, porphyritic gabbro.	South limb of northeast-trending syncline, east-trending shear zone.	Shear zone trending 073°/80°N through gabbro.	Shear zone hosting narrow quartz-iron carbonate-calcite-tourmaline veins which contain ≤1% disseminated pyrite.	pyrite Fe-carbonate calcite tourmaline chlorite chalcopyrite malachite fuchsite	Fe-carbonatization chloritization pyritization sericitization (fuchsite) silicification (bleaching)	Gabbro
Meridian Bay Occurrence	West shore of Meridian Bay. Formerly Pat. Claim S.904	Medium grained, sheared, grey granodiorite in contact with mafic metavolcanic flows.	Intense northeast-trending shear.	Northeast-trending shear zone 450 m long and 60 m wide.	Silicified shear zone hosting massive sulphide mineralization.	pyrite pyrrhotite chalcopyrite magnetite	silicification sulphidation chloritization sericitization Fe-carbonatization	Felsite dike, Atikwa Batholith
North Twin Island Occurrence	North shore of North Twin Island	Sheared, grey biotite-hornblende granite containing large xenoliths of mafic to intermediate metavolcanics.	South limb of northeast-trending syncline, east-trending shear zone.	0.3 m wide, parallel shear zones striking 080°/80°NW within granite and along granite-xenollith contacts.	Shear zones host irregular stockworks of quartz stringers and veins containing large blebs of pyrite and chalcopyrite	pyrite chalcopyrite chlorite biotite	sericitization chloritization pyritization carbonatization silicification (bleaching)	Atikwa Batholith

TABLE 1.5 Continued

Name	Location	Host Lithology	Major (Regional) Structures	Local Structure	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
Pioneer Prospect	Located on Pioneer Island. Formerly Pat. Claim M.H. 248	Intermediate tuffs and flows in contact with massive and pillowed mafic flows.	South of a northeast-trending syncline; west of strong northeast shear zone.	6 m wide shear zone strikes 030°-041° along the contact between mafic and intermediate metavolcanics.	A lens of massive sulphide mineralization within a silicified shear zone.	pyrite pyrrhotite chalcopyrite	sulphidation silicification	Felsite dikes striking 047° and coarse grained feldspar porphyry dike striking 014°.
Swanson Gold Occurrence	North shore of Eagle Lake east of Table 1.6Table merly Pat. Claim McA. 230	Massive intermediate and mafic flows.	Northeast-trending syncline.	East-trending shear zone.	Shear zone hosting narrow quartz veins containing minor pyrite.	pyrite	chloritization carbonatization	None
Viking Prospect	North shore of small island west of Net Island. Pat. Claim S. 446(?)	Mylonitized, medium-grained, grey-pink biotite-hornblende granite containing numerous blue quartz eyes and and hosting a narrow, sheared xenolith of mafic metavolcanics metamorphosed to lower amphibolite grade.	Northeast-trending syncline, major east-trending shear zone.	Wide shear zone striking 068°/80°SE.	Thin, irregular, quartz-iron carbonate veins and stringers intrude sheared metavolcanics and granite. Veins host very small amount of pyrite.	Fe-carbonate specular hematite pyrite molybdenite	Fe-carbonatization chloritization sericitization	Quartz-feldspar porphyry dike striking 064°, Atikwa Batholith.
W.W. Smith Prospect	North shore of Hardrock Bay. Pat. Claims K12180 K12181 K12184 K12185	Sheared, massive and pillowed mafic flows and massive rhyolite flows intruded by felsic dikes.	South limb of major northeast-trending syncline, east-trending shear zone.	Numerous subparallel east-trending shear zones crosscut by minor north-trending shears.	Silicified, sulphide-rich shear zones in mafic rocks and quartz veins in fractures in felsic rocks.	pyrite pyrrhotite	silicification sulphidation	Northwest-trending quartz feldspar porphyry dikes

for samples taken at the Eldorado and Golden Eagle Prospects and the North Twin Island Occurrence. A sample of sheared, altered, granitic wallrock containing <1% py, taken at the Eldorado Prospect, assayed 1640 ppb Au, while a sample of the vein assayed 80 ppb Au. Two grab samples of the quartz vein at the Golden Eagle Prospect, containing <1% pyrite, assayed 45 ppb and 3500 ppb Au, while a third sample of quartz vein, containing almost no pyrite, assayed 1.10 ounce gold per ton. A grab sample of bleached, sheared granite, from the North Twin Island Occurrence, containing 3% pyrite and iron carbonate assayed 70 ppb Au, while a grab sample from a quartz vein containing 1% to 3% chalcopyrite and pyrite assayed 5450 ppb Au (Geoscience Laboratories, Ontario Geological Survey, Toronto). A 46 cm (18 inches) wide chip sample taken across a quartz vein on the property assayed 0.40 ounce gold per ton (Ontario Ministry of Natural Resources, Production Statistical Files, Toronto). Although large blebs of visible gold were observed in quartz vein material at the Viking Property, random grab samples of the vein assayed only trace amounts of gold.

The above observations suggest that post-emplacement deformation along shear zones at the edge of the Atikwa Batholith, provided sites where ore-bearing, hydrothermal fluids could circulate and deposit gold. High grade gold values are restricted to quartz veins; however, at the Eldorado Prospect, anomalous gold is present in the slightly pyritic granitic wallrock. Sheared, metavolcanic xenoliths also provided sites where the difference in competency between the granite and mafic metavolcanics caused intense shearing.

2. Sulphide–Rich Silicified Shear Zones Three gold properties, the Meridian Bay Occurrence, Pioneer Island Prospect, and the W.W. Smith Prospect, consist of northeast- and east-trending, pervasively silicified shear zones hosting gold mineralizaton associated with massive sulphides (up to 95%) composed of pyrite, pyrrhotite, chalcopyrite, and magnetite, containing variable amounts of copper and nickel. The shear zones at the Pioneer and W.W. Smith Prospects occur within mafic metavolcanics, while the Meridian Bay Occurrence is situated within hybrid granodioritic rocks of the Atikwa Batholith, along its contact with mafic metavolcanics immediately to the east. All of the zones are associated with minimal carbonate alteration, minor quartz veining, intense pervasive silicification and sulphidation, and felsite and/or quartz-feldspar porphyry dikes crosscutting or extending sub-parallel to the shear zones. Although the W.W. Smith Prospect consists predominantly of silicified shear zones, narrow quartz veins and stringers filling numerous fractures in felsic metavolcanics and intrusive rocks, have been reported to carry generally low grade gold mineralization with a few high grade values (Assessment Files, Resident Geologist's Office, Kenora).

Random grab samples of sulphide-rich material from the Pioneer Island Prospect, taken by the author, assayed 0.04 ounce gold per ton with 276 ppm Cu and 108 ppm Ni, a second sample assayed 120 ppb Au (Geoscience Laboratories, Ontario Geological Survey, Toronto). Various grab samples from the Meridian Bay Occurrence have been reported to assay between 0.20 and 0.45 ounce gold per ton, 3.0 ounces silver per ton, 0.9 to 4.22% copper, and 0.5 to 1.0% nickel (Ontario Ministry of Natural Resources, Statistical Files). A grab sample of sulphide-rich material, taken by the author, assayed <0.01 ounce gold per ton, 965 ppm copper, and 82 ppm nickel.

The W.W. Smith Prospect in Hardrock Bay, evaluated by Birch Bay Gold Mines from 1936 to 1938, Magdalena Red Lake Mines Limited in 1948, and Tasu Resources from 1982 to 1984, to date contains the best reported gold mineralization of the three deposits. Magdalena Red Lake Mines Limited reported that the best concentrations of gold were found in sulphide replacement zones in mafic metavolcanic flows. Three channel samples from two separate shear zones, taken by the company, assayed 0.145 ounce gold per ton over 18.3 m (60 feet), 0.146 ounce gold per ton over 7.6 m (75 feet), and 0.146 ounce gold per ton over 12.2 m (40 feet). Nine holes drilled by Birch Bay Gold Mines in 1938 intersected narrow zones of generally low grade gold mineralization, although one hole targeted on a silicified, sulphide-rich zone on a small island, located in Hardrock Bay, intersected 12.2 m (40 feet) of 0.10 ounce gold per ton. Three holes drilled on the property by Tasu Resources in 1984, intersected narrow zones of low grade gold mineralization ranging from 0.025 to 0.20 ounce gold per ton (Assessment Files, Resident Geologist's Office, Kenora). Two random grab samples of silicified mafic metavolcanics containing 3% sulphide mineralization, taken by the author from the trenches at the W.W. Smith Prospect, assayed 60 ppb gold and 1.28 ounces gold per ton, while a sample containing 1% sulphide mineralization assayed 0.38 ounce gold per ton. A grab sample, taken by the author, from a quartz-feldspar porphyry dike crosscutting the property, and containing no visible sulphide mineralization, assayed 85 ppb Au, while a grab sample containing >10% pyrrhotite, also taken by the author from the sulphide zone on the small island in Hardrock Bay, assayed 0.08 ounce gold per ton, 2150 ppm copper, and 30 ppm nickel (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The above observations suggest that post-deformation, sulphide-rich, gold-bearing, hydrothermal solutions circulated through shear zones within metavolcanics and dioritic rocks and, due to the ductile nature of the shear zones, pervasively silicified, sulphidized, and replaced the host rock, rather than forming discrete quartz veins. Moorhouse (1941) suggested that the Meridian Bay Occurrence may be "a replacement of an inclusion in hybrid diorite."

3. Shear Zones in Metavolcanics The Lone Pine Prospect, Harrison Occurrence, and Swanson Occurrence all consist of relatively narrow, linear shear zones in massive and pillowed mafic flows which host quartz-iron carbonate-tourmaline veins and stringers containing abundant (1% to 5%) disseminated pyrite and chalcopyrite (Harrison Occurrence). Wallrocks are typically sheared, chloritized, sericitized, and carbonatized by either iron carbonate or calcium carbonate, and contain variable amounts of

pyrite. At the Lone Pine Prospect the mafic metavolcanics, a few metres on either side of the mineralized vein, contain abundant (5%) disseminated crystals of magnetite up to 4 mm in size.

The Fornieri Bay Prospect is an exception to the other deposits, since it occurs in felsic metavolcanics composed of massive, rhyolitic, feldspar porphyry flows intruded by quartz porphyry dikes. East-trending shear and fracture zones host narrow, white and blue-grey quartz veins and stringers containing <1% disseminated sulphide minerals consisting of pyrite, pyrrhotite, and minor chalcopyrite. Moorhouse (1941) observed visible gold and a silvery columnar mineral he identified as bismuthinite. Wallrocks are silicified, chloritized, and weakly carbonatized, containing <1% to 5% disseminated pyrite and pyrrhotite. Erie Canadian Mines Limited (1939) reported that gold mineralization occurred in strong east-west shear zones within the rhyolite, and in the noses of small drag folds in the veins (Moorhouse 1941). It is unlikely that the quartz veins were drag folded, owing to the brittle nature of the extremely siliceous host rocks. A grab sample, taken by the author, from a pyritic (<1%) quartz vein in one of the many trenches on the property assayed 45 ppb Au, while a grab sample from a pyritic (1%) feldspar porphyry assayed 50 ppb Au (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Raleigh Resources Limited have drilled 18 holes totaling 1699 m (5574 feet) from 1982 to 1985, in the vicinity of the Fornieri Bay Prospect. Sulphide-rich samples of fractured rhyolite, containing narrow quartz stringers, taken from a hole drilled in the vicinity of the old trenches in 1982, assayed 0.057 ounce gold per ton over 3 m (10 feet), and 0.374 ounce silver per ton, and 0.65% Cu over 1.5 m (5 feet). Holes drilled south and west of the trenched area in 1983, intersected relatively narrow diorite and gabbro dikes intruding rhyolitic flows and felsic tuffs hosting wide intervals of abundant (4% to 5%) pyrite, pyrrhotite, and chalcopyrite in quartz-carbonate veinlets, along fractures, and disseminated throughout moderately sheared rocks. These wide sulphide-rich intersections were found to host anomalous gold mineralization assaying 0.013 ounce gold per ton over 30 m (98 feet), and 0.025 ounce gold per ton over 40.5 m (132.8 feet), including a smaller intersection of 0.036 ounce gold per ton over 21.3 m (70 feet). In 1985, further drilling intersected more sections of anomalous gold, with one intersection assaying 0.24 ounce gold per ton over 1.1 m (3.5 feet) (Assessment Files, Resident Geologist's Office, Kenora).

The author observed small flakes of visible gold in quartz vein material from the Lone Pine Prospect and collected two grab samples of pyritic (<1%) quartz vein material which assayed 55 and 140 ppb Au, while a grab sample, taken by the author, of the altered, pyritic (1%), wallrock assayed 100 ppb Au. Grab samples, taken by the author, from other quartz-carbonate veins in the vicinity of the Lone Pine Prospect assayed only trace amounts of gold (Geoscience Laboratories, Ontario Geological Survey, Toronto). Four grab samples taken by the author, from the pyrite- and chalcopyrite-bearing quartz veins at the Harrison Occurrence, assayed 0.02 ounce gold per ton with 4880 ppm Cu, 0.22 ounce gold per ton with 0.46 ounce silver per ton and 2.22% Cu, 0.01 ounce gold per ton with 5760 ppm Cu, and <0.01 ounce gold per ton with 1640 ppm Cu (Geoscience Laboratories, Ontario Geological Survey, Toronto). Most of the samples contained between 5% and 10% pyrite, chalcopyrite, and malachite. Although the author did not visit the Swanson Gold Occurrence, Mr. A. Glatz, a prospector who recently staked the occurrence, found abundant visible gold in quartz vein material on the property (A. Glatz, personal communication, 1985).

4. Shear Zones in Mafic Intrusive Rocks The Manhattan Occurrence is the only gold deposit of this type. It consists of a sheared, chloritic, carbonatized, gabbro, intruding intermediate to felsic flows and pyroclastics. The gabbro is medium grained and porphyritic, containing large (≤1 cm), rounded, green-white feldspar phenocrysts, round blue quartz eyes (≤5 mm in size), variable amounts of biotite, and up to 5% disseminated magnetite crystals. An east-trending shear zone extends through the gabbro and hosts quartz-iron carbonate-calcite-tourmaline veins and stringers containing ≤1% disseminated pyrite. The wallrocks are intensely sheared, variably silicified, bleached pale green, and contain abundant iron carbonate, fuchsite, and disseminated pyrite (≤5%) with minor blebs of chalcopyrite and malachite. A grab sample, taken by the author, of altered, sheared gabbro, containing approximately 2% pyrite and 1% chalcopyrite, assayed 115 ppb Au and 805 ppm Cu, while a sample of altered gabbro containing no sulphide mineralization assayed 7 ppb Au and 113 ppm Cu. A grab sample, taken by the author, from quartz vein material containing 2% pyrite, assayed 720 ppb Au and 198 ppm Cu (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Summary and Conclusions The above observations have shown that all the gold deposits in the Eagle Lake area are associated with linear shear and/or fracture zones commonly trending east or northeast within granitic rocks of the Atikwa Batholith, adjacent metavolcanics, and mafic intrusive rocks. Moorhouse (1941) suggested that the widespread shearing and the variable trend of shearing, which changes abruptly throughout the area, demonstrates the "consistent parallelism of the strike of bedding and schistosity to the general boundary of the main intrusive masses" (Atikwa Batholith). Zircon U-Pb geochronology studies (Davis *et al.* 1982) have also shown that the batholithic rocks dated at approximately 2731.8 Ma are slightly younger than adjacent metavolcanics dated at approximately 2742.8 Ma, suggesting that the metavolcanics at Eagle Lake may be extrusive equivalents of the Atikwa Batholith. All of these observations suggest that shearing and fracturing in the area was developed during and after the emplacement of the Atikwa Batholith, and that the timing of the gold deposition was late.

The different types of gold deposits in the Eagle Lake area all share their own specific characteristics, which implies that multiple hydrothermal systems occurred in the area at different times. The gold-bearing quartz veins hosted by sheared granitic rocks commonly contain <1% disseminated pyrite, relatively minor amounts of iron carbonate, and alteration characterized by sericitization, chloritization, carbonatization, and silicification restricted to the immediate sheared wallrocks. The silicified, sulphide-rich shear zones commonly contain very abundant sulphide mineralization (>50%), which has partially replaced the host rocks and contains anomalous copper and nickel. Shear zones hosting quartz veins in mafic metavolcanics and mafic intrusive rocks, are characterized by carbonatization, chloritization, and sericitization in the wallrocks, and quartz-iron carbonate-tourmaline veins, commonly containing 1% to 5% pyrite, with variable amounts of chalcopyrite. Shear and fracture zones hosting quartz veins in felsic metavolcanics, are characterized by the presence of a variety of disseminated sulphide minerals within silicified and weakly carbonatized host rocks.

Exploration Guidelines There are numerous gold deposits in the Eagle Lake area, but the majority of them consist of single quartz veins and/or quartz stringers within narrow shear zones which have limited economic gold potential, due to their narrow widths and relatively short strike lengths. However, the presence of anomalous gold within sheared, altered, pyritic, granitic rock at the Eldorado Prospect and North Twin Island Occurrence suggests that the Atikwa Batholith may have the potential to host high-tonnage, low-grade gold deposits. A similar geological situation occurs in the Bluffpoint Lake area, where an altered trondhjemitic phase of the Lawrence Lake Batholith hosts wide alteration zones containing anomalous gold, and is currently under investigation by Corporation Falconbridge Copper (*see* "Straw Lake Area"). Blackburn (1982) briefly described the geology of this area and suggested that the Eagle Lake area warrants investigation for similar deposits.

Other deposits which are favourable targets for gold exploration are the sulphide-rich silicified shear zones and sheared and fractured zones within felsic metavolcanics. These types are known to host anomalous gold mineralization over considerable widths and strike lengths and are found at the Fornieri Bay Prospect (shear and fracture zones in felsic metavolcanics) and the W.W. Smith Prospect (sulphide-rich silicified shear zones in mafic metavolcanics). The greater widths can be attributed to the brittle nature of the felsic rocks, which causes them to fracture and shear when deformed, providing abundant closely spaced open fissures for the deposition of gold. The ductile nature of mafic metavolcanics has caused them to shear along discrete planes, which form fewer and more limited open fissures; except in the case of the pervasively silicified sulphide-rich zones, where hydrothermal solutions have invaded the fabric of the sheared rocks and replaced it with sulphide mineralization.

The extensive felsic metavolcanics which extend east from Fornieri Bay to Buchan Bay, consist predominantly of massive, sericitic, carbonatized quartz and feldspar porphyries and carbonate schists, which are known to be good host rocks for gold mineralization. Areas of mafic metavolcanics should also be explored for sulphide-rich silicified shear zones similar to the zones at the W.W. Smith Prospect.

FLAMBEAU LAKE–LARSON BAY MAPPING PROJECT

The Flambeau Lake-Larson Bay map area in Van Horne and Aubrey Townships lies approximately between Latitudes 49°43′ and 49°44′ and Longitudes 92°51′ and 92°57′ in the District of Kenora, and covers a 23.5 km^2 area which is 2.88 km wide by 8.16 km long. Flambeau Lake in the west and Larson Bay of Wabigoon Lake in the east are about 6.4 km south of Dryden. The area is accessible by Highway 502, Ojibway Drive, the Wabigoon Lake Road and numerous access roads and trails. J. Parker, assisted by R. Schienbein, began a geologic survey in 1985, using a base map prepared at a scale of 1:4800 (1 inch to 400 feet) by enlargement from Forestry Resources Inventory Maps, with corrections from vertical air photographs enlarged to the same scale. Compilation of geological mapping done by T.S. Joliffe for Van Horne Gold Exploration Incorporated, and by F.W. Gittings for Voyager Explorations Limited (Assessment Files, Resident Geologist's Office, Kenora) was included in the preparation of Open File Map 33. The cooperation of Kidd Creek Mines Limited is also greatly appreciated.

The Flambeau Lake-Larson Bay area was the scene of intensive gold exploration between 1897 to 1917, 1920 to 1925, and again from 1938 to 1940. There are 13 known gold properties in the area, that includes two past producers, the Redeemer and Bonanza Mines, 9 prospects and 2 occurrences. The majority of the properties, including the Redeemer and Bonanza Mines, are situated in the eastern part of the map area, west of Larson Bay, while the remainder are located immediately north, east, and west of Flambeau Lake.

Gold exploration began at the Little Jumbo Prospect, north of Guy Lake, in 1897, followed by the development of the Redeemer Mine, which produced approximately 351 ounces of gold between 1904 and 1906. The Redeemer was re-evaluated between 1910 and 1911, and produced another 8 ounces of gold in 1918. During this time other properties in the area were being exploited, but none of them produced any appreciable amounts of gold. Between 1920 and 1923 the Bonanza Mine produced 246 ounces of gold and 83 ounces of silver from 1206 tons milled at an average grade of 0.20 ounce gold per ton (Ontario Ministry of Natural Resources, Production Statistical Files, Toronto). Gold exploration was renewed in the 1980s by Voyager Explorations Limited at Flambeau Lake, and by Van Horne Gold Exploration Incorporated who re-evaluated numerous old gold properties near Larson Bay (Assessment Files, Resident Geologist's Office, Kenora). Kidd Creek Mines Limited has recently optioned a promising gold prospect on the north shore of Flambeau Lake, where Voyager Explorations Limited did work during 1983 and 1984.

General Geology

The map area is situated within the Lower Wabigoon Volcanic Group, a mixed sequence of mafic to felsic metavolcanics, that overlies the Eagle Lake Volcanic Group, a thick sequence of massive and pillowed mafic flows, and underlies the Upper Wabigoon Volcanic Group, a pillowed mafic flow sequence occurring at the top of the volcanic succession. All three groups are characterized by predominantly tholeiitic rocks with distinct iron-enrichment trends (Trowell *et al.* 1980). The metavolcanics are bounded by the Atikwa Batholith to the south and by clastic metasediments and derived migmatites of the English River Subprovince to the north.

Zircon U-Pb geochronology (Davis *et al.* 1982) has shown that the Lower Wabigoon Volcanics were deposited over a period of approximately 8 million years, and are about the same age or slightly older (minimum age of about 2734.8 Ma), than rocks of the Atikwa Batholith (minimum age of about 2731.8 Ma) which suggests that the metavolcanics of the Lower Wabigoon Volcanic Group are the extrusive equivalents of the Atikwa Batholith.

About 4.8 km north of the map area, the Wabigoon Fault extends in an east-west direction along the contact between the metasediments in the north and metavolcanics to the south. The metavolcanics are folded about a number of tight east-trending folds close to the Wabigoon Fault (Blackburn *in* Trowell *et al.* 1977). Blackburn (1981) recognized an east-trending lineament which extends through Larson Bay of Wabigoon Lake. Satterly (1943) noted that the Wabigoon Volcanics which extend southwards from Wabigoon Lake to the Atikwa Batholith, were all north- to northeast-facing, based on 81 top determinations from pillow lavas.

The map area is underlain by lower greenschist facies mafic to felsic metavolcanics consisting of massive and brecciated flows intercalated with pyroclastic flows. The metavolcanics are intruded by intermediate and mafic dikes, felsic dikes and gabbro, diorite, and quartz-diorite dikes and stocks.

The metavolcanics in the Flambeau Lake-Larson Bay area can be subdivided into the following four map groups: mafic, intermediate to mafic, intermediate to felsic, and felsic. Factors such as colour of the fresh surface, colour of the weathered surface, hardness, visible quartz content, and mafic mineral content were used to assign them to their respective categories.

Massive, brecciated, and pillowed mafic and intermediate to mafic flows occur throughout the area. They are typically fine-grained, light to dark green-grey, extremely chloritic, carbonatized, amygdaloidal, pyritic, variably magnetic, and contain epidote pods. They consist dominantly of autoclastic flow breccias composed of angular pillow fragments, scoriaceous amygdaloidal material and devitrified hyaloclastite intimately intermixed with intermediate to mafic pyroclastics. Pillowed flows are common south of Flambeau Lake and south and north of the Bonanza Mine near Larson Bay. Pillows are typically large (up to 1.8 m long and 1.2 m wide), with thick (<2.5 to 7.6 cm) selvages and large (≤3 cm) abundant amygdules. Interpillow material is common and consists of ashy intermediate to felsic material which drapes the pillows and occurs between them. Massive mafic flows are commonly fine- to medium-grained and amygdaloidal, however, coarse-grained magnetite-bearing flows were found west of Flambeau Lake, immediately south of Ojibway Drive. Massive intermediate to mafic, fine- to coarse-grained, light to dark green-grey flows are commonly found south of the Bonanza Mine and along the northern shore of Guy Lake. Most of them are dioritic to gabbroic with ≤35% to 50% mafic minerals, with quartz and magnetite as common accessory minerals. T.S. Joliffe of Van Horne Gold Exploration Incorporated interpreted these rocks to be major sills (Assessment Files, Resident Geologist's Office, Kenora); however, their conformable nature and the lack of observed intrusive contacts have led the author to interpret them to be massive flows.

All of the felsic metavolcanic flow rocks are located in the vicinity of Flambeau Lake in the western part of the map area. These consist dominantly of felsic autobreccias intercalated with felsic pyroclastics, where the distinction between autoclastic and pyroclastic phases can be subtle. An extensive unit of rhyolitic brecciated flows and pyroclastics is located along the eastern shore of Flambeau Lake and extends eastward to Bob Lake. These rocks are extremely fine-grained, weather buff white-grey to pink, and are typically sericitic and weakly to moderately carbonatized, containing variable amounts of disseminated magnetite and pyrite. Less extensive units of brecciated felsic flows are located immediately south of Pritchard Lake and immediately north of Flambeau Lake, where they are located adjacent to a small quartz-diorite stock, and where they seem to merge into the stock.

Most of the felsic flows grade into thick units of intermediate to felsic brecciated and massive flows and pyroclastics, which are situated in a broad area north of Bob Lake and extend eastward to Larson Bay. These rocks are very similar to the felsic flows, but are darker grey and contain more abundant mafic minerals and disseminated pyrite. The felsic and intermediate to felsic flows commonly host narrow pyritic quartz-iron carbonate veins which have filled tension fractures and shear zones.

Pyroclastic metavolcanics are abundant throughout the area and consist of heterolithic, poorly sorted, pyroclastic flows, which include debris flows and tuff-breccias, with a common chaotic appearance.

Of the four pyroclastic map groups, intermediate to mafic and mafic pyroclastics are the most abundant in the area, and are dark green-grey, chloritic, carbonatized, and pyritic, consisting of rounded to angular, lapilli-size, intermediate fragments, with less abundant mafic and felsic fragments within a fine-grained to gritty, intermediate to mafic matrix. The intermediate and mafic fragments may be porphyritic, vesicular, or amygdaloidal and are commonly accessory. Abundant angular, intermediate to mafic blocks, usually 6.4 cm to 28 cm in size, were observed in many outcrops in the Larson Bay area and south of Flambeau Lake. The proportion of fragments to matrix varies considerably (30% to 90% fragments), and the pyroclastics may or may not be fragment supported. The pyroclastic flows south of Flambeau Lake are commonly intimately intermixed with mafic brecciated flows and are very thickly bedded with ash layers containing small (≤1 cm) felsic to intermediate fragments.

Intermediate to felsic pyroclastics share much the same characteristics as the intermediate to mafic rocks, except that the matrix is usually intermediate and dark grey, containing variable amounts of biotite and chlorite. These pyroclastics are commonly fragment supported where the fragments are typically lapilli-size and composed of cherty, white, angular, felsic fragments, sub-rounded intermediate fragments, and sub-rounded to angular mafic fragments. Large intermediate to mafic blocks are common but not abundant.

The felsic pyroclastics are situated in the immediate Flambeau Lake area and consist of rounded to sub-rounded, cherty and siliceous lapilli-size fragments, which are fragment supported (>80% fragments) in a slightly chloritic and sericitic felsic matrix. These pryoclastics are commonly intercalated with autobrecciated flows east of Flambeau Lake.

A thin minor unit of intermediate to felsic crystal tuff is situated in a roadcut on Highway 502, south of Flambeau Lake, at the south boundary of the map area. It consists of irregular shards and crystals (≤2 mm in size) of white feldspar phenocrysts in a fine-grained, dark grey-green, siliceous matrix.

Thin units of reworked and bedded, intermediate to felsic tuffs randomly occur throughout the area and can be observed several metres east and south of the Redeemer Mine, in scattered outcrops in the northwestern corner of the map area, southwest of Flambeau Lake and along the south shore of Larson Bay. They consist of thinly bedded and evenly laminated, fine-grained, silty and sandy, tuffaceous material, which may be crossbedded and is typically interbedded with gritty and pebbly material. A scour-and-fill channel containing coarse pebbly material occurs in evenly laminated sandy layers and can be observed in an outcrop east of the Redeemer Mine shaft.

Numerous, fine-grained, grey to dark grey-green, mafic to intermediate dikes occur throughout the area, with a dominant easterly trend. They are very abundant around Larson Bay (Bruce 1925) and in the Flambeau Lake area, where they are commonly vesicular, amygdaloidal, and porphyritic with "flow-banding" occurring along the edges of the dikes, parallel to their contacts. Abundant mafic dikes intrude a gabbro situated southwest of Flambeau Lake and appear to have been plastically deformed when the gabbro and dikes were in a semi-molten state.

Gabbro and diorite intrusions are common in the immediate Flambeau Lake area, where an extensive and previously unmapped gabbro extends from the north shore of Flambeau Lake to the southwestern corner of the map area. It intrudes a small quartz-diorite stock on the north shore of Flambeau Lake and is flanked to the north by relatively small, elliptical, diorite intrusions.

The gabbro is typically massive, fine- to coarse-grained and dark green, containing variable amounts of accessory quartz, magnetite, and biotite. The gabbro also contains abundant xenoliths of intermediate to felsic pyroclastics along its contact boundary and a few large epidote pods. In some outcrops the gabbro appears to be dioritic, which suggests the presence of numerous intermediate phases. On the northern shore of Flambeau Lake the gabbro is carbonatized, chloritized, silicified, and pyritic, making identification difficult.

The dioritic intrusions in the area are massive, pale grey, and fine- to medium-grained containing abundant accessory magnetite. In comparison to the gabbro they contain less mafic minerals and much more abundant feldspar and quartz. Most of the diorites near Flambeau Lake are intensely silicified, carbonatized, sericitized, chloritized, and pyritic, which makes identification of original mineralogy virtually impossible. Unaltered small gabbro and diorite intrusions were also mapped east of Flambeau Lake and at the Ideal Prospect immediately west of Twingrass Lakes.

The majority of felsic intrusive rocks consist of fine-grained, buff white-grey and pink, quartz-feldspar porphyry and felspar porphyry dikes which occur throughout the area. The dikes may be 6 cm to 30 m wide and consist of small (≤2 mm), white feldspar and quartz phenocrysts in a siliceous, fine-grained matrix which may or may not contain up to 5% mafic minerals (biotite, hornblende), disseminated pyrite and magnetite. The rocks are commonly carbonatized and sericitic where sheared or fractured. The dikes strike in a general northwestern direction throughout the area, however, they are more east-trending in the Larson Bay area. Felsite dikes are also common and are of the same composition as the porphyries except that they are extremely fine-grained, phenocrysts are absent and disseminated magnetite is more abundant.

A second type of felsic intrusive rock occurs as a small quartz-diorite stock located on the north shore of Flambeau Lake. It is the host to gold-bearing quartz veins occurring in tension fractures. It is typically fine- to medium-grained, consisting of approximately 60% to 70% quartz, 25% to 40% feldspar, and up to 3% mafic minerals retrograded to chlorite. Original mineralogy is obliterated by intense alteration which occurs throughout the stock. A "clotty" phase of quartz-diorite occurs along its northern contact: dark green and pale grey clots (≤1 cm in size), consisting of chlorite, sericite and carbonate, and sericite-carbonate respectively, occur in a fine-grained siliceous ground mass. The quartz-diorite contains abundant fine-grained disseminated magnetite (up to 5%) and pyrite.

A diabase dike of undetermined Proterozoic or Archean age trends in a northwestern direction across the western part of the map area, north of Flambeau Lake. The dike varies in width from 30 to 90 m and is dark grey-green, fine- to coarse-grained and massive, with typical rusty weathering.

Structural Geology

In the Larson Bay area, bedding orientations and rock contacts in the metavolcanics are generally east-trending and dip steeply to the north, with pillows and sedimentary structures consistently facing north. In the western part of the area around Flambeau Lake, bedding orientations and rock contacts change to a general northeastern trend, with pillows facing northwest in the southwestern corner of the map area. This change of orientation suggests a broad, arcuate bend in the metavolcanics from east to west. Foliation is generally uniformly east-trending, and steeply dipping to vertical throughout the map area, with lineations in the vicinity of Flambeau Lake plunging steeply to the west or northwest.

Numerous sub-parallel to parallel linear shear zones, striking between 075° and 100°, and dipping steeply to the north or vertical, occur within mafic and intermediate metavolcanic and intrusive rocks throughout the area. These zones can vary in width from <1 m to 90 m with considerable strike lengths, and are commonly associated with quartz-carbonate veins, felsic dikes, carbonate alteration, and gold mineralization. The overall east-west trend of the shear zones suggests that they were developed parallel to the Wabigoon Fault located north of the map area. Mafic dikes in the map area are dominantly east-trending and may be controlled by east-trending structures.

Numerous *en echelon* tension fractures in felsic intrusive rocks and felsic metavolcanics are common in the western part of the area in the vicinity of Flambeau Lake. The fractures commonly trend between 120° and 150°, dip steeply to the north, and are associated with quartz-carbonate veins, carbonate alteration and gold mineralization. The dominant northwesterly trend of felsic dikes, as well as the overall northwesterly trend of the diabase dike, suggests that these fractures controlled the emplacement of late intrusive rocks. The fractures are intrepreted to be related to dextral movement on the Wabigoon Fault, during simple shear deformation, where tension fractures are developed perpendicular to the maximum elongation (Ramsay 1967).

A feature which occurs only locally, west of Flambeau Lake, is a narrow northeast-trending mylonite zone within massive intermediate to felsic flows and mafic amygdaloidal flows. The mafic flows are very intensely sheared, while the felsic flows display a mylonitic texture where narrow (<1 cm) anastomosing shear planes, consisting of sericite, envelop lenses of relatively undeformed rock. A crenulation cleavage can also be observed within the mylonite zone. The local significance of the zone is problematical, however, it may represent a structural feature which has developed perpendicular to the maximum shortening direction during dextral movement on the Wabigoon Fault.

Alteration

Weak to moderate iron-carbonate alteration is commonly present in the metavolcanics and felsic intrusive rocks throughout the area; however, the most intense alteration is confined to numerous shear and fracture zones. Moderate to intense and extensive iron carbonate alteration is associated with gold and sulphide mineralization immediately north of Flambeau Lake, in a broad zone extending east from Pritchard Lake, and in the rocks northeast of the Bonanza and Redeemer Mines. The felsic metavolcanics east of Flambeau Lake are weakly to moderately carbonatized and are commonly sericitic. Other types of alteration such as sericitization, chloritization, silicification, and pyritization are restricted to the wallrocks of shear zones hosting quartz veins which are commonly gold-bearing.

Gold Occurrences

The general characteristics of each gold property in the Flambeau Lake-Larson Bay map area are summarized in Table 1.6. The gold deposits can be divided into two types: 1) shear zones in metavolcanics and felsic intrusive rocks hosting quartz veins; and 2) tension fractures in metavolcanics and felsic intrusive rocks hosting quartz veins. These two types are described below.

1. Shear Zones in Metavolcanics and Felsic Intrusive Rocks The majority of gold properties in the map area, except for the East, New East, and West Zones on the Flambeau Lake Prospect, consist of mineralized quartz-carbonate veins, stringers, and stockworks hosted by east-trending linear shear zones of variable widths within mafic to felsic metavolcanics and felsic intrusive rocks. Veins typically consist of white quartz, variable amounts of orange iron carbonate, buff-brown to yellow calcite, abundant black tourmaline, and minor (≤1%) finely disseminated pyrite with accessory sulphide minerals such as chalcopyrite, galena, and sphalerite. Weak to moderate wallrock alteration usually consists of carbonatization and chloritization, which may be accompanied by sericitization, silicification (bleaching), pyritization, and tourmalinitization. Almost all of the gold properties in the Larson Bay area, such as the Bonanza and Redeemer Mines, have weak to moderate wallrock alteration strictly confined to the sheared host.

Quartz-feldspar porphyry and felsite dikes are associated with almost all of the gold properties in the map area. Quartz-carbonate veins and stringers typically occur within the dikes or along their sheared contacts. The dikes are variably carbonatized, sericitic, and silicified, containing <1% to 2% disseminated pyrite, while the felsic dikes at the Vanlas and League Prospects contain variable amounts of disseminated magnetite as well as pyrite. Felsic dikes are generally east-trending in the Larson Bay area, and northwest-trending felsic dikes occur at the Flambeau Lake Prospect and in the surrounding Flambeau Lake area, however, none of them are known to host gold-bearing quartz veins.

The Ideal Prospect is an exception to the gold properties described above, since it consists of a small dioritic stock intruded by a wide quartz-feldspar porphyry dike. A wide, intense, east-trending shear zone extends through the diorite and porphyry dike, with quartz veins occurring in the diorite and along the diorite-porphyry contacts, however, the most abundant quartz veins occur within the dike, where alteration and pyritization appears to be the most intense.

The majority of gold occurrences in the Larson Bay area were sampled by the author and by Van Horne Gold Exploration Incorporated, assay results from the sampling are listed in Table 1.7. Most of the assay results were erratic, however, almost all of the quartz veins that were sampled carried gold.

The best consistent assay results were obtained from samples, taken by the author, from trenches and dumps on the Vanlas Prospect. The Glatz Occurrence, the two Vanlas shafts, and numerous trenches located between them, occur within a broad zone of

TABLE 1.6 CHARACTERISTICS OF GOLD PROPERTIES IN THE FLAMBEAU LAKE - LARSON BAY MAP AREA

Name	Location	Host Lithology	Major (Regional) Structures	Local Structures	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
Bonanza Mine	400 m east of Twingrass Lakes Conc.1 Lot 7 Van Horne Township Claim K533304	Intermediate to mafic pyroclastic flows and flow breccias.	East-trending lineament and Wabigoon Fault north of the property.	Narrow shear zones trending 082°/90°.	Shear zones host narrow, lenticular quartz-carbonate-tourmaline veins containing ≤1% pyrite.	pyrite tourmaline calcite sphalertie galena hematite	chloritization carbonalization	Northwest-trending quartz-feldspar porphyry dikes and east-trending mafic dikes.
Drake Prospect	430 m west of Twingrass Lakes. Conc. 1 Lot 9 Van Horne Township Patented Property	Intermediate to mafic pyroclastic flows and flow breccias.	East-trending lineament and Wabigoon Fault, north of the property.	Very narrow linear fracture and shear zone trending 090°-095° for more than 245 m.	Shear zone hosts very narrow (≤0.3 m) linear quartz-iron carbonate-tourmaline vein containing 1% pyrite.	pyrite chlorite tourmaline calcite Fe-carbonate	silicification chloritization sericitization pyritization carbonatization	None
East Zone, Flambeau Lake Prospect	North shore of Flambeau Lake Conc.1 Lot 1 Aubrey Township Conc 1 Lot 12 Van Horne Township Pat. Claims A.L. 83 and A.L. 90	Magnetite-bearing, massive quartz diorite.	East-trending Wabigoon Fault north of the property.	Local tension fractures trending 130°-140°, crosscut by narrow east-trending shears.	Abundant tension fractures host numerous, subparallel quartz veins containing ≤1% pyrite.	pyrite magnetite tourmaline chalcopyrite sphalerite galena	silicification bleaching pyritization carbonatization sericitization Fe-carbonatization chloritization	gabbro, northwest-trending felsite and quartz-feldspar porphyry dikes crosscutting east-trending mafic and intermediate dikes.
Glatz, A., Pritchard Lake Occurrence	Immediately east of Pritchard Lake, Conc. 1 Lot 11 Van Horne Township Claim K672567	Immediate to mafic pyroclastic flows and tuffs and flow breccias.	On strike with wide east-trending shear zone. Property is south of Wabigoon Fault.	Several narrow, subparallel shear zones, striking 075°/90°.	Shear zones host narrow quartz-tourmaline veins containing 1% pyrite.	pyrite tourmaline chlorite	chloritization sericitization carbonatization	Northwest-trending feldspar porphyry dikes.

TABLE 1.6 Continued

Name	Location	Host Lithology	Major (Regional) Structures	Local Structures	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
Golden Moose Prospect	400 m south of Twingrass Lakes Conc. 1 Lot 8 Van Horne Township Patented Property	Intermediate to mafic pyroclastic flows and flow breccias.	South of east-trending lineament and Wabigoon Fault.	0.9-1.5 m wide east-trending shear zone.	Shear zone hosts narrow 0.3 m wide quartz-tourmaline-carbonate vein containing ≤1% pyrite.	pyrite chlorite tourmaline calcite	chloritization carbonatization	East-trending intermediate dike.
Good Luck Prospect	400 m west of Twingrass Lakes Conc. 1 Lot 8 Van Horne Township Claim K533394.	Intermediate to mafic pyroclastic flows and flow breccias.	South of east-trending lineament and Wabigoon Fault.	Narrow linear shear zone trending 090°-095°.	Shear zone hosts narrow (≤0.3 m) quartz-iron carbonate-tourmaline vein containing vein ≤1% pyrite.	pyrite tourmaline chlorite Fe-carbonate	chloritization silicification sericitization carbonatization	None
Ideal Prospect	180 m west of Twingrass Lake Conc. 1 Lot 8 Van Horne Township Claim K533394.	Massive, medium-grained, green-grey diorite intruded by a wide quartz-feldspar porphyry dike.	South of east-trending lineament and Wabigoon Fault.	Wide east-trending shear fracture zone extends through diorite and porphyry.	Shear zone hosts 0.9 m wide quartz-iron carbonate-tourmaline veins and stringers containing ≤1% pyrite.	pyrite iron-carbonate tourmaliane hematite	chloritization sericitization Fe-carbonatization pyritization tourmalinitization	East-trending, pyritic, quartz-feldspar porphyry dike.
League Prospect	Two shafts west of Larson Bay Conc. 1 Lot 6 Van Horne Township Claims K558594, K558597.	Intermediate to felsic brecciated flows.	South of east-trending lineament and Wabigoon Fault.	4.6 m wide shear zone striking 090°/80°N	Narrow quartz-iron carbonate-tourmaline veins containing <1% pyrite	pyrite Fe-carbonate chlorite tourmaline magnetite hematite	sericitization pyritization carbonatization chloritization	felsite dike(?) containing magnetite.

TABLE 1.6 Continued

Name	Location	Host Lithology	Major (Regional) Structures	Local Structures	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
Little Jumbo Prospect	Immediately north of Guy Lake. Conc. 1 Lot 10 Van Horne Township Claim K672028	Intermediate pyroclastic flows and massive flows intruded by a massive quartz-feldspar porphyry dike.	South of Wabigoon Fault.	Metavolcanics strongly foliated $086^\circ/85^\circ$N, intensely sheared and mylonitized quartz-feldspar porphyry dike.	Fracture and shear zones within quartz-feldspar porphyry dike host quartz-calcite-tourmaline veins and stringers containing $\leq$1% pyrite.	pyrite calcite tourmaline	sericitized carbonatized	Quartz-feldspar porphyry dike trending 120°-130°.
Lost Prospect	Two shafts west of Larson Bay. Conc. 1 Lot 6 Van Horne Township Claims K558586, K558598	Massive mafic flows, intermediate to mafic pyroclastic flows and brecciated flows intruded by a felsite dike.	South of east-trending lineament and Wabigoon Fault.	Wide zone of intense shearing and fracturing striking 085° through the metavolcanics and felsite dike.	Shear zones hosting narrow quartz-chlorite-tourmaline veins and stringers containing <1% pyrite.	pyrite chlorite tourmaline	chloritization sericitization pyritization carbonatization	pyritic, felsite dike striking 081°-084°.
New East Zone, Flambeau Lake Prospect	North of Flambeau Lake. Conc. 1 Lot 1 Aubrey Township Pat. Claim A.L. 90	Magnetite-bearing quartz-diorite intruded by a quartz-feldspar porphyry dike.	South of Wabigoon Fault.	Narrow shear zones striking $108^\circ/50^\circ$N, $127^\circ/76^\circ$N and $061^\circ/81^\circ$NW, tension fractures striking 100°-110° and 155°-165°	Shear zones and tension fractures hosting quartz-iron carbonate-tourmaline veins containing <1% pyrite.	pyrite magnetite Fe-carbonate tourmaline chlorite hematite	silicification (bleaching) pyritization Fe-carbonatization sericitization	quartz-feldspar porphyry dike striking 335°, east-trending intermediate and mafic dikes.
Redeemer Mine	600 m south of Bonanza Mine. Conc. 1 Lot 6 Van Horne Township Claim K558584	Intermediate to mafic tuffs and flows intercalated with massive, mafic, amygdaloidal, flows.	South of east-trending lineament and Wabigoon Fault.	3.0 m wide shear zone striking 106°-$110^\circ/85$N	Shear zone hosts 2.5 m wide stockwork of quartz-iron carbonate-tourmaline veins ands stringers containing $\leq$1% pyrite.	pyrite Fe-carbonate tourmaline chlorite	sericitization Fe-carbonatization chloritization silicification	pyritic, felsite dike intruding shear zone.

TABLE 1.6 Continued

Name	Location	Host Lithology	Major (Regional) Structures	Local Structures	Mineralization Type	Associated Minerals	Wallrock Alteration	Local Intrusions
S.V. 372 Occurrence	300 m south of Redeemer Mine.	Fine to medium grained, grey-green, massive intermediate flows.	South of east-trending lineament and Wabigoon Fault.	0.3-0.9 m wide, linear shear zone striking 080°.	Shear zone hosts narrow, irregular quartz-iron carbonate veins containing <1-2% pyrite.	pyrite Fe-carbonate hematite	sericitization pyritization chloritization carbonatization	None
Vanlas Prospect	Two shafts east of Pritchard Lake. Conc. 1 Lot 11 Van Horne Township Shaft 1 on patented property Shaft 2 on Claim K706027	Intermediate to mafic tuffs and pyroclastic flows.	South of east-trending Wabigoon Fault.	Very wide shear and fracture zones striking 075°/85°N within metavolcanics and felsic dike.	Shear zones and fractures hosting quartz-iron carbonate-calcite-tourmaline veins containing ≤1% pyrite.	pyrite Fe-carbonate tourmaline chlorite	Fe-carbonatization sericitization chloritization pyritization	magnetite-bearing diorite/gabbro dike?, magnetite-bearing pyritic, quartz-feldspar porphyry dike.
West Zone Flambeau Lake Prospect	West of Flambeau Lake on Ojibway Drive Road. Conc. 1 Lot 2 Aubrey Township Pat. Claim R.541	Massive, mafic, amygdaloidal, flows and intermediate to felsic massive flows intruded by gabbro and mafic and felsic dikes.	South of east-trending Wabigoon Fault.	Intensely sheared zones trending 058°/76°NW within mafic metavolcanics and a protomylonite zone trending 040°/045° through felsic metavolcanics.	Tension fractures hosting quartz-tourmaline-iron carbonate veins striking 100-110° and 128-130° containing ≤1% pyrite and <1% chalcopyrite and malachite. Shear zones host massive pyrite mineralization up to 50%.	pyrite tourmaline Fe-carbonate chalcopyrite malachite	sericitization chloritization Fe-carbonatization pyritization tourmalinitization	gabbro, northeast-trending mafic dikes crosscut by northwest-trending quartz-feldspar porphyry dike.

TABLE 1.7 ASSAY RESULTS FROM GOLD OCCURRENCES NEAR LARSON BAY

Location	Type of Sample	Sample Description	Assay Results*	Van Horne Gold Exploration Assay Results**
Bonanza Mine (dump)	grab	quartz vein, 2% pyrite	1.42 ounces Au/ton	
Bonanza Mine (dump)	grab	quartz vein, 3% pyrite, chalcopyrite	0.15 ounce Au/ton 4180 ppm Cu	
Open cut west of Bonanza Shaft	grab	quartz vein, <1% pyrite	1740 ppb Au	
Drake Prospect (dump)	grab	quartz vein, 1% pyrite	170 ppb Au	
Drake Prospect (dump)		quartz vein, 1% pyrite	870 ppb Au	
Drake Prospect (dump)	representative grab	?		0.20 ounce Au/ton
Golden Moose Prospect (dump)	grab	?		0.31 ounce Au/ton
Good Luck Prospect (dump)	representative grab	?		0.12 ounce Au/ton
Ideal Prospect (dump)	grab	?		0.12 ounce Au/ton
League Prospect, dump at No. 1 shaft	grab	quartz vein, <1% pyrite	1690 ppb Au	
League Prospect, dump at No. 2 shaft	grab	quartz vein, <1% pyrite	370 ppb Au	
League Prospect, trench west of No. 2 shaft	grab	quartz vein, <1% pyrite	85 ppb Au	
Lost Prospect two trenches east of No. 1 shaft	2 grabs	quartz vein, <1% pyrite	1950 ppb Au 7950 ppb Au	
Lost Prospect edge of No. 2 shaft	grab	felsite dike, 2-3% pyrite	300 ppb Au	
Redeemer Mine (dump)	2 grabs	quartz vein, ≤1% pyrite	0.02 ounce Au/ton 0.28 ounce Au/ton	
S.V. 372 Prospect, trenches	2 grabs	sericitic wallrock, <1-2% pyrite	460 ppb Au 1820 ppb Au	
S.V. 372 Prospect, trenches	grab	?		0.04 ounce Au/ton 0.18 ounce Au/ton
S.V. 372 Prospect, dump	grab	?		0.02 ounce Au/ton

*Geoscience Laboratories, Ontario Geological Survey, Toronto
**Assessment Files, Kenora Resident Geologist Office

moderate to intense carbonate alteration associated with east-trending shearing and fracturing which extends eastward from Pritchard Lake within intermediate to mafic pyroclastics. Numerous pyritic quartz veins occur throughout the zone, as well as east-trending felsic dikes commonly containing variable amounts of disseminated pyrite and magnetite, and hosting quartz veins. A grab sample of pyritic (<1%) quartz vein material, taken by the author, from a trench at the Glatz Occurrence, located 140 m east of Pritchard Lake, assayed 3530 ppb Au. Grab samples from quartz veins in trenches west of the Vanlas No. 1 shaft assayed 1300 and 3150 ppb Au. Grab samples of pyritic quartz vein material from the dump at the Vanlas No. 1 shaft assayed 1110 and 9700 ppb Au, while a grab sample of carbonatized, magnetic, pyritic (<1%) felsite, taken from the dump assayed 450 ppb Au. A grab sample from quartz vein material on the dump of the Vanlas No. 2 shaft assayed 3730 ppb Au, while a grab sample of magnetic, pyritic (2%) felsite and quartz vein material taken from the dump, assayed 1140 ppb Au (Geoscience Laboratories, Ontario Geological Survey, Toronto). Sampling done by T.S. Joliffe of Van Horne Gold Exploration Incorporated, also indicates that gold mineralization occurs throughout this broad zone of carbonate alteration, fracturing, and shearing (Assessment Files, Resident Geologist's Office, Kenora).

2. Tension Fractures in Metavolcanics and Felsic Intrusive Rocks Gold-bearing quartz veins, hosted by northwest-trending tension fractures within metavolcanics and felsic intrusive rocks occur at the East, New East, and West Zones, at the Flambeau Lake Prospect, immediately north of Flambeau Lake.

The Flambeau Lake Prospect was optioned by Mr. A. Kozowy to Voyager Explorations Limited, who did linecutting, VLF-EM and magnetometer surveys, trenching, sampling, and geological mapping, followed by eight diamond-drill holes totaling 981 m (3220 feet), during 1983 and 1984. Four of the eight holes intersected narrow sections of gold mineralization assaying between 0.11 and 0.29 ounce gold per ton. All four holes were drilled in the vicinity of the East Zone (Assessment Files, Resident Geologist's Office, Kenora). The property was returned to Mr. Kozowy when Voyager Explorations subsequently dropped the option. Mr. Kozowy did more intensive prospecting and stripping on the property in early 1985, which led to the discovery of numerous high grade gold-bearing quartz veins at the East Zone. Kidd Creek Mines Limited optioned the property from Mr. Kozowy during the summer of 1985 and began an exploration program.

Quartz veins on the property are commonly composed of white quartz, orange-brown iron carbonate, black tourmaline and ≤1% disseminated pyrite with accessory sulphide minerals such as chalcopyrite, galena, and sphalerite. Wallrock alteration is characterized by pervasive silicification, pyritization, carbonatization, and sericitization. Alteration haloes occur around the quartz veins, where the most intense alteration is immediately adjacent to the veins and decreases abruptly about 10 cm or less on either side of the veins.

At the East Zone, located on the north shore of Flambeau Lake, quartz veins are hosted by a very wide zone of numerous, *en echelon*, northwest-trending tension fractures, crosscut by several narrow east-trending shears, within an intensely altered quartz-diorite stock containing abundant disseminated magnetite and a few narrow magnetite veinlets. The diorite has been intruded by a gabbro and east-trending mafic to intermediate dikes, crosscut by quartz-feldspar porphyry dikes. All rock types are intruded by quartz veins, although the veins are less numerous in the mafic rocks. This may be due to differences in rock competency, where the brittle felsic rocks fracture more readily during deformation than the more ductile mafic rocks. Significant gold mineralization is restricted to the quartz veins and does not occur within the altered wallrocks. Throughout the Flambeau Lake Prospect, veins hosted by felsic dikes are devoid of gold. Quartz veins within a "high-grade" trench on the East Zone host massive pyrite mineralization associated with chalcopyrite, galena, and sphalerite. A 100 pound sample, taken from the trench by Mr. A. Kozowy, assayed 1.7 ounces gold per ton (A. Kozowy, personal communication, 1985). Four grab samples, taken by the author from quartz veins in a number of trenches on the East Zone, assayed 0.02 ounce gold per ton, 3.86 ounces gold per ton with 4.88 ounces silver per ton, 0.17 ounce gold per ton, and 0.04 ounce gold per ton. Four grab samples of quartz vein material, taken by the author, from trenches 45 m east of the East Zone assayed between 0.03 and 0.04 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto). Chip samples taken from various trenches on the East Zone by Voyager Explorations Limited assayed 0.088 ounce gold per ton over 2.7 m (9 feet), 0.089 ounce gold per ton over 2.4 m (8 feet), 0.103 ounce gold per ton over 1.8 m (6 feet), and 0.636 ounce gold per ton over 2.4 m (8 feet) (Assessment Files, Resident Geologist's Office, Kenora).

At the New East Zone, 245 m northwest of the East Zone, quartz veins are hosted by northwest-trending tension fractures, and east-, northeast-, and northwest-trending narrow shear zones within a second magnetite-bearing diorite stock. The diorite is intruded by a northwest-trending quartz-feldspar porphyry dike and east-trending intermediate to mafic dikes.

The wallrocks adjacent to the quartz veins are intensely pyritic and carbonatized; however, the majority of the diorite is weakly to moderately altered, because tension fractures and quartz veins are not as abundant as at the East Zone. Seven grab samples of quartz vein material taken by the author from 4 trenches on the zone assayed between <0.01 and 0.11 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

The West Zone, located on the Ojibway Drive Road about 1 km west of the East Zone, consists of northwest-trending gold-bearing quartz veins crosscutting intense northeast-trending shear zones within massive, mafic, amygdaloidal flows. The mafic metavolcanics are intercalated with mylonitized, massive, intermediate to felsic flows intruded by northeast-trending intermediate to mafic dikes and a small gabbro intrusion. The mafic dikes and deformed metavolcanics are crosscut by a northwest-trending quartz-feldspar porphyry dike. The quartz veins occur within tension fractures which have formed perpendicular to the dominant shear direction in the mafic metavolcanics, which is also crosscut by a quartz-feldspar porphyry dike. There is an obvious absence of quartz veins in the felsic metavolcanics, which suggests that the mylonitic style of deformation in the felsic rocks did not allow the formation of open tension fractures. The quartz veins host ≤1% disseminated pyrite and <1% chalcopyrite and associated malachite. Sheared metavolcanics, in a trench at the extreme west end of the zone, appear to be partially replaced by massive pyrite (≤50%) and have been tourmalinitized. A grab sample, taken by the author, from the sheared, pyritic (15%) metavolcanics assayed 495 ppb Au, while a grab sample, taken by the author, from a pyritic (2%) quartz vein in the same trench assayed 5360 ppb Au. A grab sample, taken by the author, from a quartz vein containing <1% pyrite and chalcopyrite, in the most easterly trench on the West Zone, assayed 1.52 ounces gold per ton with 56 ppm Cu (Geoscience Laboratories, Ontario Geological Survey, Toronto). A 4.8 m (16 feet) long chip sample, taken from the eastern trench by Voyager Explorations Limited, assayed 0.249 ounce gold per ton (Assessment Files, Resident Geologist's Office, Kenora).

Northwest-trending tension fractures hosting quartz veins occur throughout the Flambeau Lake area. Grab samples, taken by the author, from quartz veins in an intensely sheared and altered gabbroic to dioritic host rock, approximately 182 m (600 feet) east of Flambeau lake, assayed 0.01, 0.02, and 0.04 ounce gold per ton and 155 ppb Au, 5330 ppb Au, and 7640 ppb Au. A grab sample, taken from approximately the same location by Mr. A. Kozowy, assayed 0.229 ounce gold per ton (A. Kozowy, personal communication). Grab samples taken by the author from quartz veins in sheared and altered intermediate to felsic brecciated flows, 365 m (1200 feet) east of Flambeau Lake, assayed 160, 1250, 1640, and 3380 ppb Au (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Summary and Conclusions

The gold occurrences in the Flambeau Lake-Larson Bay map area are confined to the Lower Wabigoon Volcanic Group where they are structurally controlled by east-trending, linear shear and fracture zones and by northwest-trending, *en echelon* tension fractures. These structures provided open conduits for the circulation of mineralized hydrothermal fluids which deposited gold. The tension fractures and shear zones have also controlled the emplacement of felsic dikes. Mafic dikes are controlled by east-trending structures. Long continuation of the regional stress regime is indicated by the emplacement of a later northwest-trending diabase dike which crosscuts the western half of the map area. The tension fractures and shear zones are regionally related to the Wabigoon Fault, in response to dextral movement along it. The abundance of quartz veins controlled by tension fractures in the Flambeau and Guy Lake area is due to the local abundance of felsic metavolcanics and intrusive rocks. The brittle nature of the felsic rocks has caused them to fracture during deformation while the mafic and intermediate rocks have sheared. The lack of felsic rocks in the eastern part of the map area, in the vicinity of Larson Bay, explains why most of the gold occurrences in that area are controlled by east-west shear zones. The presence of quartz veins crosscutting intense northeast-trending shear zones (West Zone) and of east-trending shears crosscutting gold-bearing quartz veins (East Zone), indicates a complex deformational history, developed over a long period of time, both pre- and post-dating gold mineralization.

Abundant disseminated magnetite within some of the country rocks hosting gold-bearing quartz veins (Flambeau Lake Prospect, Vanlas Prospect, League Prospect), may have served as a chemical trap for gold precipitation: sulphidation of magnetite by pyrite during the circulation of mineralized hydrothermal fluids through open fissures in the country rocks. Macdonald (1984) has suggested three processes to explain gold deposition within iron-rich rocks. Crystallization of gold from hydrothermal fluids may occur either by the plating of gold upon sulphide grains, or by the destabilization of gold in solution by a fall in fluid pH, caused by CO_2 loss during carbonate formation, or by the destabilization of gold in solution due to sulphur loss. Any or all of these processes may have operated at the Flambeau Lake Prospect, where abundant pyrite occurs within intensely carbonatized wallrocks, and where gold is restricted to quartz veins as visible gold, or associated with sulphide mineralization in the quartz veins.

The presence of numerous amygdaloidal dikes in the Flambeau Lake area may indicate their subvolcanic emplacement. At the East Zone, on the Flambeau Lake Prospect, the presence of autobrecciated felsic flows immediately adjacent to the quartz-diorite stock, which seem to merge into the stock, suggests that the stock is subvolcanic. However, implications for gold mineralization are unclear.

Many of the above conclusions are preliminary and may change during further field investigations anticipated for 1986.

Exploration Guidelines

Numerous gold occurrences consisting of single quartz veins or quartz stockworks within narrow shear zones have limited economic gold potential. Wide, east-trending zones of alteration, shearing, and fracturing may have better potential for gold, such as the zone which extends eastward from Pritchard Lake, in the vicinity of the Glatz Occurrence and Vanlas Prospect.

Wide fracture zones within felsic, magnetite-bearing intrusive rocks and felsic metavolcanics are also favourable targets due to their greater widths. Fractures within the host rocks provide abundant open fissures for the circulation of hydrothermal fluids, while the magnetite serves as a chemical trap for gold deposition. Sheared and fractured magnetite-bearing mafic intrusive rocks and metavolcanics are also good targets for the same reasons.

Gold-bearing quartz veins associated with magnetite-rich host rocks are not confined to the present map area but occur, for example, at the New Church Lake Occurrence in the Kawashegamuk Lake area, and at the Manhattan Occurrence and Lone Pine Prospect in the Eagle Lake area.

The quartz-diorite and gabbro intrusions at Flambeau Lake are represented by a magnetic high, centred on the East Zone of the Flambeau Lake Prospect. This type of magnetic signature can be readily identified on ODM-GSC Aeromagnetic Maps and can assist in locating other magnetite-rich intrusions, which may host gold mineralizaton associated with intense alteration, tension fractures and/or shear zones. Induced polarization surveys and/or very detailed magnetometer surveys may also assist in detecting zones of secondary sulphide enrichment which may host gold.

The stratigraphy in the map area is generally representative of the Lower Wabigoon Volcanic Group which extends eastward to Dinorwic Lake: the geology, according to Satterly (1943), consists of lenticular masses of felsic flows and agglomerates, some of which may be intrusive, intercalated with intermediate to mafic flows and agglomerates with widespread, but selective, iron carbonate alteration, where the felsic rocks are commonly fractured and altered to carbonate-sericite schists. These deformed and altered felsic rocks should be investigated for gold, as well as sheared and altered mafic metavolcanics.

DIAMOND DRILL CORE STORAGE PROGRAM

The core library program commenced in September 1985, and is intended to serve the three Northwestern Mining Divisions (Kenora, Patricia, and Red Lake). The building is currently (December 1985) under construction and due to be completed in early 1986. The library is staffed by C. Storey and C. Ravnaas.

Core collection in the Kenora area consisted of 287 m (940 feet) of core from the Kawashegamuk Lake area drilled by Labrador Exploration (Ontario) Limited. This deposit is described by Storey (1984) as a marble occurrence. During October, 1520 m (5000 feet) of core from the Sioux Narrows area was hauled to Kenora, and arrangements were made to obtain approximately 900 m (3000 feet) of other core from drilling north of Lobstick Bay, and another 1058.4 m of core from Bag Lake. Another 738 m (2420 feet) of mineralized and sampled core, drilled by Tasu Resources, was obtained from storage at Clearwater Bay, and arrangements were made to pick up what remains at their drill location on Eagle Lake. Core collection in the Sioux Lookout area is being handled under a Special Employment Program by the Sioux Lookout Resident Geologist; approximately 15 000 m is being collected. At Red Lake, an undetermined amount (possibly 2000 m) of core is in storage, and an additional 1470 m (4820 feet) was recovered from insecure storage in Cochenour.

In addition to this core, a large amount currently in storage at the three resident geologists' offices is being inventoried in preparation for transfer to the core library when the building is completed. Approximately 34 000 m of core will be available for examination when the facility opens.

Since the beginning of September 1985, there have been six direct inquiries about the core library from the mining industry, and two requests to examine core already in storage.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

During the 1985 field season, the following field parties from the Precambrian Geology and Mineral Deposits Sections operated within the Kenora Mining Division:

J.A. Ayer (Precambrian Geology Section) carried out detailed mapping of the Rat Portage Bay Area, Lake of the Woods, thereby completing a two-year program commenced in 1984 in the Bigstone Bay area (Figure 1.2, location A).

G.W. Johns (Precambrian Geology Section) continued a synoptic survey designed to provide a regional synthesis of geological data in the Gibi Lake-Kakagi Lake-Rowan Lake area (Figure 1.2, location B).

P.M. Smith (Mineral Deposits Section) conducted a detailed study of the geological setting of the Duport Gold Mine, Shoal Lake (Figure 1.2, location C).

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

As of the end of November 1985, 82 designated OMEP programs, conducted by 65 companies, and on which a total of $4.96 million of assistance is anticipated, were operative in Kenora Mining Division.

RESEARCH BY OTHER AGENCIES

UNIVERSITY THESES

Geological theses related to the Kenora Mining Division believed to be in progress or completed during 1985 are as follows:

Masters Theses

Melling, D.: Completed a study of the geological setting and genesis of the Cameron Lake gold deposit of Nuinsco Resources Limited (Carleton University).

Smith, P.M.: Commenced a study of the geological setting of the Duport Gold Mine of Consolidated Professor Mines Limited, at Shoal Lake (University of Waterloo).

Stix, John: Completed a study of the transition from lower tholeiitic through to upper calc-alkaline volcanic rocks at Andrew Bay, Lake of the Woods, entitled "Volcanic Facies and Geochemistry of Archean Lava Flows and Pyroclastic Rocks near Kenora, Ontario, Canada" (University of Toronto).

Doctoral Theses

Edwards, G.R.: Completed a study of Archean volcanic, subvolcanic, and plutonic rock petrogenesis in the Kagagi-Pipestone Lakes area (University of Western Ontario).

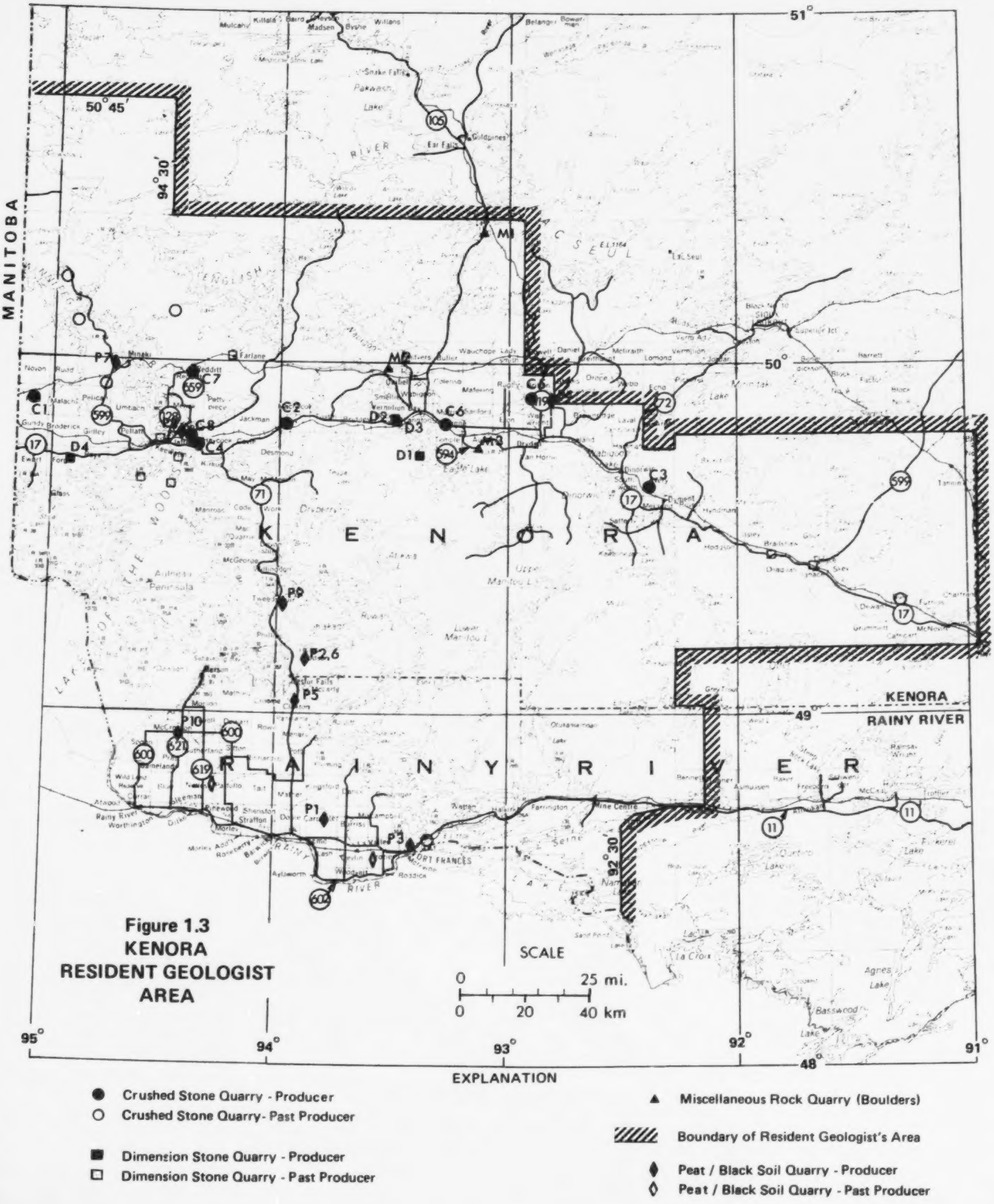
51°
50°45′
94°30′
MANITOBA
50°
49°
48°
92°30′
95°
94°
93°
92°
91°
KENORA
RAINY RIVER
K E N O R A
R A I N Y R I V E R
LAC SEUL
ENGLISH RIVER
LAKE OF THE WOODS
RAINY RIVER
RAINY LAKE
FORT FRANCES
C1
C2
C3
C4
C5
C6
C7
C8
D1
D2
D3
D4
M1
M2
M3
P1
P2,6
P3
P5
P7
P9
P10
17
71
105
502
559
594
599
600
602
619
621
11
72
SCALE
0
25 mi.
0
20
40 km
EXPLANATION
● Crushed Stone Quarry - Producer
○ Crushed Stone Quarry - Past Producer
■ Dimension Stone Quarry - Producer
□ Dimension Stone Quarry - Past Producer
▲ Miscellaneous Rock Quarry (Boulders)
▨ Boundary of Resident Geologist's Area
♦ Peat / Black Soil Quarry - Producer
◊ Peat / Black Soil Quarry - Past Producer

Figure 1.3
KENORA
RESIDENT GEOLOGIST
AREA

QUARRYING ACTIVITY

(Other than sand and gravel)

Information is from MNR quarry permit records, resident geologist files and Building and Ornamental Stone Inventory (OGS OFR 5446 and OFR 5522)

CRUSHED STONE

C1	CNR White	granitoid rock	track ballast
C2	CPR Hawk Lake	granitoid rock	track ballast
C3	CPR Melgund Lake	traprock (metavolcanic)	track ballast
C4	Degagne Bros. Ltd.	granitoid rock	aggregate
C5	Eino Stenburg	granitoid rock	aggregate
C6	George Kupper Contracting Ltd.	granitoid rock	aggregate
C7	MTC	granitoid rock	road construction and aggregate
C8	Towland - Hewitson Construction Ltd.	traprock (metavolcanic)	aggregate

Inactive quarries are shown by a symbol but no identifier

DIMENSION STONE

D1	Frank Thorgrimson	soapstone	carving material
D2	Granite Quarriers (GQI) Inc.	granite	building and monumental stone
D3	Nelson Granite Ltd.	granite	building and monumental stone
D4	Rush Bay Quarries	flagstone	building stone

Inactive quarries are shown by a symbol but no identifier

PEAT AND BLACK SOIL

P1	Arctic Peat Moss Ltd.	peat	Carpenter Township
P2	Carl Bragg	black soil (no new production)	Godson Township
P3	Du-Nor Products	peat/potting soil	McIrvine Township
P4	Gus Marion and Sons Ltd.	black soil	Britton Township
P5	Linton Judson	black soil	Claxton Township
P6	Linton Judson	black soil	Godson Township
P7	Lou Cordeiro	black soil (no new Production)	Minaki*
P8	Nu-Terra Ltd.	peat/potting soil	Jaffray Township
P9	Penner Contracting Ltd.	black soil	Tweedsmuir Township
P10	Robert J. Tofte	black soil	McCrossan Township

Inactive quarries are shown by a symbol but no identifier

MISCELLANEOUS

M1	Frank Attrux	boulders	Perrault Lake*
M2	G. Barr	boulders	Gordon Lake*
M3	Orrie Colegrove	boulders	Aubrey Township

*refers to claim map area

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

D.M. Watkinson and D. Melling, Carleton University, completed a study of the geological setting and genesis of the Cameron Lake gold deposit.

OTHER RESEARCH

Don Davis, of the Royal Ontario Museum, continued his general interest in geochronological investigations in the Kenora Mining Division, and collected samples from the Shoal Lake area, and Mulcahy Lake, the latter in conjunction with Nuno Machado, also of the Royal Ontario Museum.

Professor H.C. Palmer, University of Western Ontario, initiated rock magnetic studies in the Mulcahy Lake Intrusion, near Eagle Lake.

A number of individuals, including K.H. Poulsen, of the Geological Survey of Canada, Warren Day, of the United States Geological Survey, and S.B. Shirey, of the Carnegie Institute of Washington, continued their research along the Wabigoon-Quetico subprovince boundary in the Fort Frances-Mine Centre area.

Personnel under contract to the Geological Survey of Canada carried out a study of fracture patterns in the Dryberry Batholith.

Graduate students under the general direction of Professor D. Perkins, University of North Dakota, conducted field studies in the vicinity of Highway 105, west of Lac Seul, as part of a continuing program of research into metamorphism and crustal genesis in the English River Subprovince.

Cameron Lake, the site of ongoing gold exploration, has been chosen by the Geoscience Working Group, an ad-hoc subcommittee of the Canadian Advisory Council on Remote Sensing, for special study. In 1985 geobotanical investigations were initiated, under the general coordination of D. Horler.

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2. Red Lake Resident Geologist Area, Northwestern Region

M.J. Lavigne Jr.[1] **and B.T. Atkinson**[2]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Red Lake

[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Red Lake

INTRODUCTION

After the exceptionally high 1984 claim staking activity, 1985 was a return to normal levels of claim staking. However, the number of claims recorded in 1984 (second only to 1969 when claim staking was high due to the discovery of the South Bay Base metal deposit) has translated into a two-fold increase in assessment work credits for the current year. The amount of work recorded in 1985 is second only to that performed in 1970.

Table 2.1 shows that exploration methods for gold and base metals have not changed substantially over the years. The proportions of diamond drilling, geophysics, geology, and other work (including stripping, trenching, prospecting, and geochemistry) performed for assessment work credits has remained essentially constant, even though base metals were the focus of exploration in 1970 and gold dominated exploration activity during 1984-1985. These statistics are misleading because much of the work performed in gold exploration is not filed for assessment credits. This work includes stripping, trenching, prospecting, and geochemistry. Thus, as expected, exploration companies are increasing the amount of prospecting and stripping in the search for gold mineralization.

The Birch Lake area, where most of the activity is taking place, was largely unstaked in early 1984. In contrast to other reasonably accessible greenstone belts in the province which underwent very active staking in 1981, 1982, and 1983, the Birch Lake area remained relatively inactive. Thus, in 1984, the Birch Lake area still had large tracts of favourable ground open for staking. Presently, the eastern half of the Birch Lake area is tightly staked while the remainder of the Birch-Confederation Lakes greenstone belt is only 20% covered by active claims.

The Red Lake camp is also undergoing a revival. Projected production at the Campbell Red Lake Mine in 1985 will reach a new high, probably 20 000 ounces more than 1984. The Arthur W. White Mine, formerly the Dickenson Mine, has maintained production in excess of 60 000 ounces per year for the past three years and has substantially increased its ore reserves. An air of optimism surrounds the underground exploration program on the McFinley Red Lake Mines Limited property; Jamie Frontier Resources Incorporated continued its underground exploration at the Mount Jamie mine and Esso Minerals Canada continued its underground exploration of the Cochenour mine for most of this year. A common thread to many exploration programs is the re-evaluation of major prospects and past producers where significant amounts of gold were discovered but never completely explored and evaluated. Successful efforts are being made to consolidate land packages and resume exploration on dormant patented properties.

The current optimism generated by the activity in Red Lake is counterbalanced by the impending closure of the Griffith iron ore mine south of Red Lake. During peak production, this mine had over 500 employees. Other than depressed iron markets and the low cost international iron production, the major factors causing this closure are the cost of hydro, natural gas, and rail transportation. Despite the impending closure of the Griffith mine, iron "ore" reserves remain at 41 million tons.

RESIDENT GEOLOGIST STAFF ACTIVITIES

In 1985, the office of the Resident Geologist was staffed by M.J. Lavigne, Resident Geologist; and B.T. Atkinson, Resource Geologist. Summer and fall support staff consisted of L. Zagozewski, geological assistant; and K. Boylen, computer clerk. Occasional assistance was also provided by H. MacDonald-Craig (Ministry of Natural Resources) for computer installation and programming and by Katimavik youths for field work.

Increased exploration activity and Ontario Geological Survey activity has dictated that much time was spent making property visits, leading field trips, and participating in field trips. Atkinson and Lavigne participated in the Institute on Lake Superior Geology Conference and field trip in May, at which Lavigne presented a paper on the geology and gold deposits of the Geraldton-Beardmore greenstone belt. After discussions with the Ear Falls Economic Development Advisory Group on the possibilities of economic stimulation of the Ear Falls area by the mining sector, several propositions were made and implemented by the Ministry of Natural Resources. These include geologic mapping on Birch Lake, a gold study in the Uchi-Confederation Lakes area, and a prospecting course. This 12-week course was given by Atkinson in cooperation with Confederation College in Ear Falls and was well attended. Similar interactions are also underway with the Red Lake Economic Development Corporation.

Lavigne began a mapping project, at a scale of 1 inch to 400 feet, over the area between Snib Lake and Howey Bay of Red Lake. This area contains the Howey, Hasaga and Red Lake Gold Shore mines as well as the Buffalo prospect. The initial emphasis will be on structure and its relationship to gold mineralization, followed by a lithogeochemical alteration study. Atkinson has begun detailed mapping of poorly recorded gold prospects in the Red Lake area. In preparation for the Red Lake field trip of the GOLD '86 Conference, to be held September 1986 in Toronto, Lavigne has been stripping and mapping outcrops in detail, as well as sampling for lithogeochemical analysis and thin sections. Several youths from the Katimavik program provided field support. A computerized indexing system for the assessment files is now 35% complete. This program was funded by

Experience '85 and the data input was done by Boylen. In cooperation with the Mineral Deposits Section of the Ontario Geological Survey, Lavigne has completed his investigations on the application of sulphur isotopes on mine scale gold exploration.

In addition to leading field trips in Red Lake for many mining company groups, several university researchers, and government geologists, field trips were also given to Katimavik youths, Junior Rangers, Ministry of Natural Resources personnel, and the Mesabi Range Geological Society.

In 1985, the following occurrences, prospects, past producers, and mines were visited by the staff of the Red Lake Resident Geologist Office:

1. Bathurst Mine, Skinner Township
2. Price-Logan Prospect, Skinner Township
3. Consolidated Shunsby Occurrence, Skinner Township
4. Dickenson Mines Prospect, North Spirit Lake
5. Silver Spirit Mines Occurrence, North Spirit Lake
6. Upper Canada Mines Occurrence, North Spirit Lake
7. G. Desmeules Occurrence, North Spirit Lake
8. Spirit Lake Mines Occurrence, North Spirit Lake
9. BP Selco Property, North Spirit Lake
10. St. Joe; South Greencamp Occurrence, Birch Lake
11. St. Joe; Greencamp Occurrence, Birch Lake
12. St. Joe; Horseshoe Island Prospect, Birch Lake
13. Beakhouse Occurrence, Birch Lake
14. Springpole Portage Occurrence, Birch Lake
15. Kidd Creek; MacGregor Occurrence, Birch Lake
16. Kidd Creek; MacKenzie Red Lake Gold Mines-Hansen Option, Birch Lake
17. Titus Keewaycabo Occurrence, Shabumeni Lake
18. Sol D'Or Mine, Grace Lake
19. Shabumeni-Dome Occurrence, Shabumeni Lake
20. Jackson Manion Mine (Orofino), Dent Township
21. Uchi Mine (Lac), Earngey Township
22. Master Resources and Development Property, Favourable Lake
23. W. Drosdoski Property, Heyson Township
24. Goldquest; Lassie Prospect, Balmer Township
25. Goldquest; MacMarmac Property, Dome Township
26. Alcourt Prospect, Fairlie Township
27. Sandy Creek Pegmatite Beryl Prospect, Ear Falls
28. Campbell Red Lake Mine, Balmer Township
29. Arthur W. White Mine, Balmer Township
30. McFinley Mine, Bateman Township
31. Mount Jamie Mine, Todd Township
32. Griffith Mine, Bruce Lake.

From these property visits, some interesting observations were made and unexpected gold assays produced. The Bathurst mine, a past producer, is located between Car and Bathurst Lakes in Skinner Township. The property consists of 12 leased claims. Several observations made at this site do not conform with those made on gold deposits in general. Firstly, the mineralization, which consists of sulphide and carbonate-poor fissure filling quartz veins, is hosted by amphibolite grade gabbro, pillowed magnesium tholeiites, and felsic dikes. This is inconsistent with the preponderance of gold mineralization which occurs as sulphide impregnations when hosted by amphibolite grade rocks.

Secondly, despite evidence for high fluid flow in a 0.5 square mile area, evidenced by abundant large quartz veins with visible gold, the country rock has undergone no visible alteration. The only visible alteration is in the immediate wallrock which has been sheared and sulphidized. Of the five veins examined, three easily yielded visible gold. One of these veins, the #5 vein, has an uncovered maximum width of 10 feet. The lack of wallrock alteration in such close proximity to abundant gold mineralization produces some doubt on the effectiveness of lithogeochemistry as an exploration tool. Although its usefulness has been demonstrated in many Archean gold camps, the variability in intensity and types of alteration associated with gold mineralization suggest that one must proceed with caution and integrate this tool with other exploration methods.

The Price-Logan property, a dormant group of four patented claims on the eastern boundary of the Bathurst property, was also visited. The mineralization consists of a sulphide impregnated, talcose, east-west trending shear zone containing isolated quartz lenses. This mineralization is exposed for about 1/4 mile, from the northeastern corner of Car Lake. Excellent exposure was provided by deep wide pits. The host rock is unaltered pillowed magnesium tholeiite. Three grab samples from this zone assayed 0.014, 0.22, and 0.54 ounce gold per ton.

An impressive looking, highly sheared, altered, and sulphidized lean iron formation at the southwestern end of Birch Lake does not contain gold. Three analyses taken from the Beakhouse occurrence produced the following gold values: 4 ppb, 2 ppb, and <2 ppb. The pyrite in these sediments occurs as rods at the bedding-cleavage intersection. Relict jasperoid chert beds have been reduced to a light pink colour and no magnetite was found interbedded. This mineralization is considered anomalous by the authors since despite the alteration, shearing, and sulphide content, no gold is present.

Another anomalous association was observed on the western side of South Bay of Birch Lake. Gold mineralization at both the Greencamp and South Greencamp occurrences is associated with wide calcite veins and not the ankeritic veins normally associated with gold mineralization. The calcite veins, one of which is 6 feet wide, trend 110° and are enclosed in well bedded wackes trending 150°. No evidence was found to support the alternative hypothesis, that the calcite represents a shear-transposed carbonate sediment. Two assays taken by the authors from an isolated 2-inch quartz vein from this location ran 2.42 and 0.24 ounces gold per ton. The calcite veins have a gold content in the low ppb range.

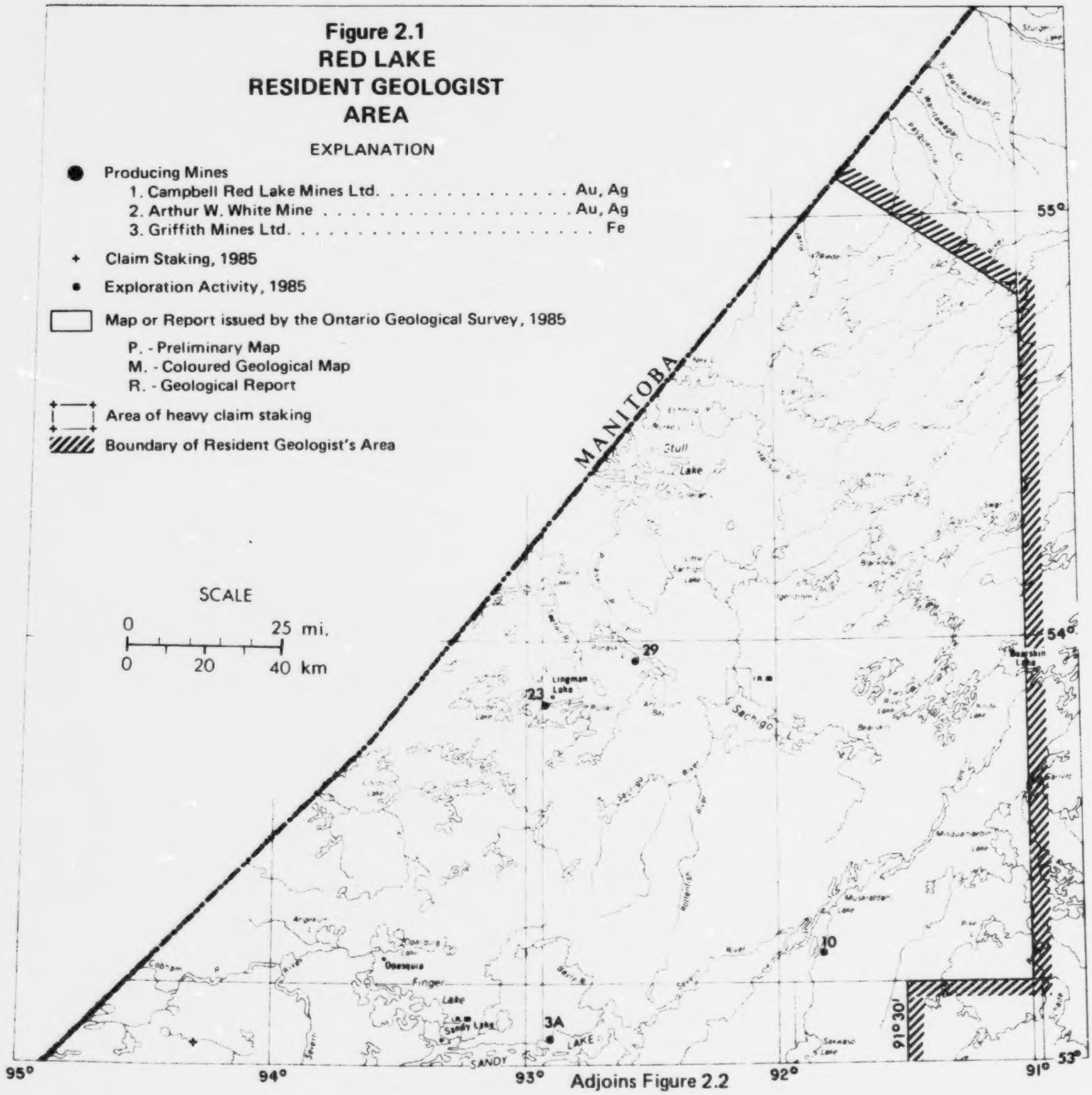

Figure 2.1
RED LAKE
RESIDENT GEOLOGIST
AREA

EXPLANATION
● Producing Mines
1. Campbell Red Lake Mines Ltd. . . . . Au, Ag
2. Arthur W. White Mine . . . . Au, Ag
3. Griffith Mines Ltd. . . . . Fe
+ Claim Staking, 1985
• Exploration Activity, 1985
☐ Map or Report issued by the Ontario Geological Survey, 1985
P. - Preliminary Map
M. - Coloured Geological Map
R. - Geological Report
Area of heavy claim staking
▨ Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km
MANITOBA
Stull
Lake
Sachigo L.
Lingman Lake
Opasquia
Finger
Lake
Sandy Lake
SANDY
LAKE
Bearskin Lake
Muskrattan Lake
River
29
23
10
3A
55°
54°
53°
95°
94°
93°
92°
91°
91° 30'

Adjoins Figure 2.2

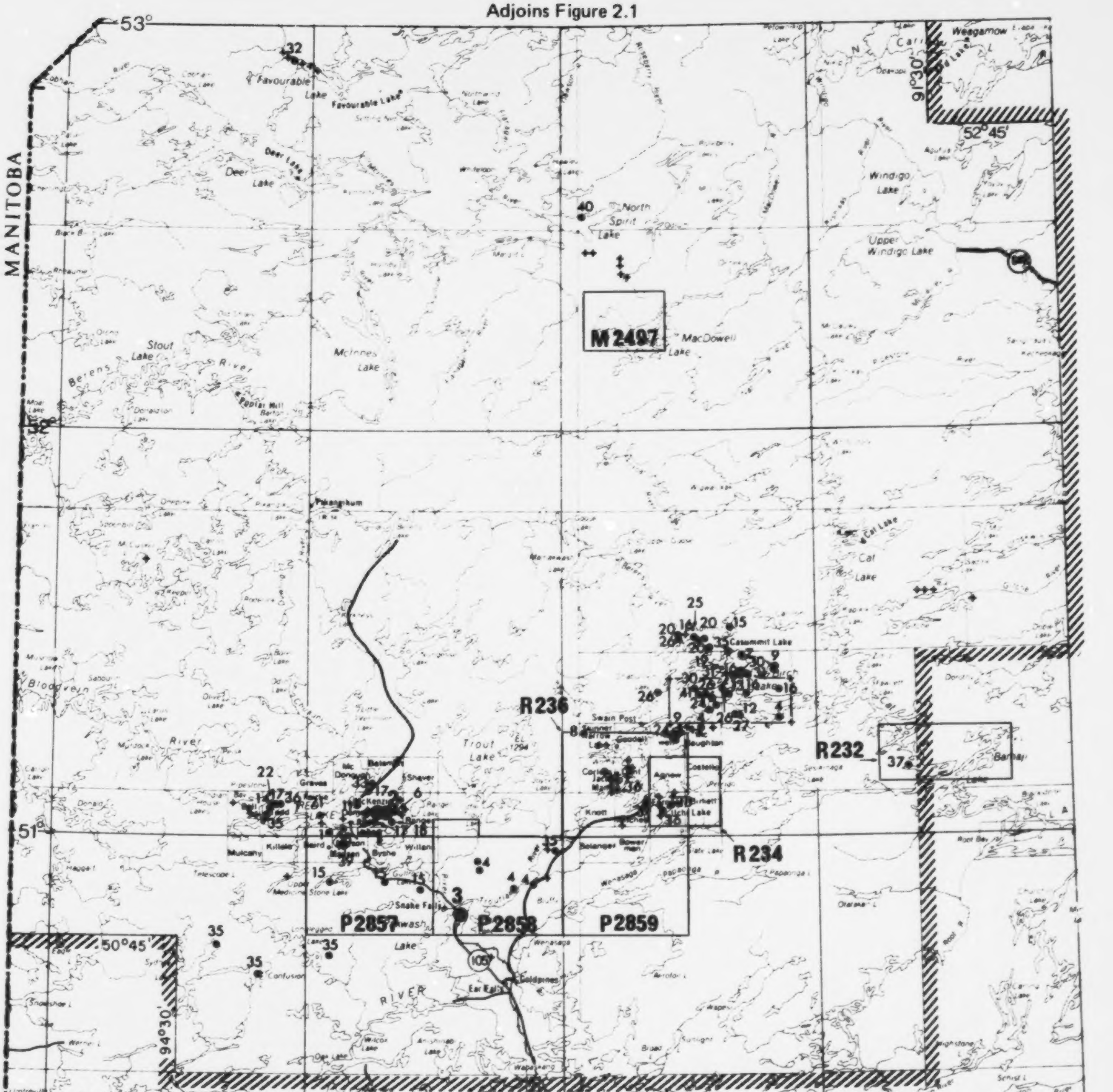
Adjoins Figure 2.1
53°
MANITOBA
91°30'
52°45'
Favourable Lake
Deer Lake
North Spirit Lake
Windigo Lake
Upper Windigo Lake
M 2497
MacDowell Lake
McInnes Lake
Stout Lake
Berens River
52°
Pikangikum
Cat Lake
Casummit Lake
R236
R232
R234
Trout Lake
Bloodvein River
51°
P2857
P2858
P2859
50°45'
94°30'
105
Ear Falls
RIVER
LAC SEUL
ENGLISH
SCALE
0
25 mi.
0
20
40 km
50°
95°
94°
93°
92°
91°
SIOUX LOOKOUT

Figure 2.2
RED LAKE
RESIDENT GEOLOGIST
AREA

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 2.1

Number on Figure	Individual or Company	Activity
1	AIKEN-RUSSET RED LAKE MINES LTD.	GEOPHYSICAL SURVEYS IN BAIRD TWP.
2	BERNIER, KEN	MAGNETOMETER SURVEY IN SATTERLY LAKE MAP SHEET
3	BERTRAM, ANDY	TRENCHING IN MITCHELL TWP.
3A	BORTNICK, J.S.	GEOPHYSICAL SURVEYS IN RAHILL LAKE MAP SHEET OF SANDY LAKE
4	BP RESOURCES CANADA LTD.	DDH(2)-612' IN McNAUGHTON TWP. GEOPHYSICAL SURVEYS IN KARAS LAKE, SEAGRAVE LAKE, GERRY LAKE AND SOUTH OF OTTER LAKE MAP SHEETS GEOPHYSICAL SURVEYS IN BUCKETT LAKE MAP SHEET OF NORTH SPIRIT LAKE DDH(1)-551' IN KARAS LAKE MAP SHEET DDH(5)-1396' IN SEAGRAVE LAKE MAP SHEET DDH(3)-1405' IN SOUTH OF OTTER LAKE MAP SHEET TOTAL: 3964' IN 11 HOLES
5	CAMPBELL RED LAKE MINES LTD.	DIAMOND DRILLING ON CRAIBBE-FLETCHER PROPERTY, DOME TWP.
6	COMINCO LTD.	OVERBURDEN DRILLING IN BALMER TWP. GEOPHYSICAL SURVEYS IN SATTERLY LAKE MAP SHEET
7	CRAWFORD, H.A.	GEOPHYSICAL SURVEYS IN CASUMMIT LAKE MAP SHEET TRENCHING IN SKINNER TWP.
8	CRONLEY, R.B.	TRENCHING IN SKINNER TWP.
9	DOME EXPLORATION (CANADA) LTD.	GEOLOGICAL, GEOPHYSICAL SURVEYS AND DIAMOND DRILLING IN CORLESS TWP. I.P. AND GEOLOGICAL SURVEYS AND DIAMOND DRILLING IN HONEYWELL TWP. GEOLOGICAL AND GEOPHYSICAL SURVEYS IN CASUMMIT LAKE AND KEIGAT LAKE MAP SHEETS DIAMOND DRILLING IN CASUMMIT LAKE MAP SHEET OF BIRCH LAKE
10	ELDOR RESOURCES LTD.	GEOLOGY AND DIAMOND DRILLING IN KIPPEN LAKE MAP SHEET
11	ESSO MINERALS CANADA	UNDERGROUND AND SURFACE EXPLORATION OF THE COCHENOUR WILLANS MINE, DOME TWP. INCLUDING OVER 50, 000 FT OF UNDERGROUND AND SURFACE DIAMOND DRILLING
12	FASKEN, BETTY J.	AIRBORNE GEOPHYSICAL SURVEYS IN SATTERLY LAKE MAP SHEET
13	FROSTBITE RESOURCES INC.	DIAMOND DRILLING, GEOPHYSICAL AND GEOCHEMICAL SURVEYS IN SATTERLY LAKE MAP SHEET
14	GIBSON, ROBERT	DIAMOND DRILLING, TRENCHING IN TODD TWP.
15	GOLDEN TERRACE RESOURCES CORPORATION	AIRBORNE GEOPHYSICAL SURVEYS IN BROWNSTONE LAKE AND CASUMMIT LAKE MAP SHEETS GEOPHYSICAL SURVEYS IN DIXIE LAKE, SOUTH OF BYSHE TWP. AND FAULKENHAM LAKE MAP SHEETS DIAMOND DRILLING IN CASUMMIT LAKE AREA
16	GOLD FIELDS CANADIAN MINING LTD.	AIRBORNE AND GROUND GEOPHYSICAL SURVEYS AND GEOLOGICAL SURVEYS IN CASUMMIT LAKE MAP SHEET
17	GOLDQUEST EXPLORATION INC.	326 HOURS POWER STRIPPING, 580 HUMUS SAMPLES COLLECTED FOR 14 ELEMENT ANALYSIS, GEOLOGICAL MAPPING AT 1:2500 SCALE ON ALL PROPERTIES DIAMOND DRILLING INCLUDES:

PROPERTY	TWP.	NO.OF HOLES	FOOTAGE
ABINO	BATEMAN	8	4, 957
DUSCHENSE	BATEMAN		
FORSYTH	BATEMAN		
INORE	BATEMAN/McDONOUGH	16	8, 041
ASHMORE	BATEMAN/McDONOUGH		
KILBARRY	BALMER	5	2, 696
LADDIE	BALMER		
S.E. GROUP	BALMER	3	2, 011
LAKE ROWAN	TODD	51	14, 895
	TOTAL:	83	32, 600

Number on Figure	Individual or Company	Activity
18	GRANGES EXPLORATION LTD.	GEOPHYSICAL AND GEOCHEMICAL SURVEYS IN BALMER TWP.
19	HEINRICH, BRADLEY LENZ	DIAMOND DRILLING, STRIPPING IN CASUMMIT LAKE MAP SHEET
20	HOPGSON, RAND	GEOLOGICAL SURVEYS, ASSAYING IN CASUMMIT LAKE AND SHABUMENI LAKE MAP SHEETS
21	HOMESTAKE MINERAL DEVELOPMENT CO.	AIRBORNE GEOPHYSICAL SURVEYS IN FAIRLIE TWP.
22	JAMIE FRONTIER RESOURCES INC.	UNDERGROUND EXPLORATION OF THE MOUNT JAMIE MINE, TODD TWP. INCLUDING 16, 000 FT DRILLED IN 100 HOLES, PLUS 10 SURFACE HOLES
23	KENNCO EXPLORATIONS (CANADA) LTD.	GEOLOGICAL AND GEOCHEMICAL SURVEYS IN NORTH OF LINGMAN LAKE MAP SHEET AND GEOLOGICAL AND GEOPHYSICAL SURVEYS IN LINGMAN LAKE MAP SHEET
24	KIDD CREEK MINES LTD.	GEOLOGICAL AND GEOPHYSICAL SURVEYS PLUS STRIPPING AND TRENCHING IN SATTERLY LAKE MAP SHEET GEOPHYSICAL SURVEYS IN HONEYWELL TWP.
25	KOSTYNUK, ALEX	STRIPPING AND TRENCHING IN CASUMMIT LAKE MAP SHEET

TABLE 2.1 **Continued**

Number on Figure	Individual or Company	Activity
26	LABRADOR MINING AND EXPLORATION CO. LTD.	AIRBORNE GEOPHYSICAL SURVEYS IN CASUMMIT AND LITTLE SHABUMENI LAKE MAP SHEETS AIRBORNE GEOPHYSICAL SURVEYS IN LITTLE SHABUMENI LAKE AND SHABUMENI LAKE MAP SHEETS GEOLOGICAL AND GEOCHEMICAL SURVEYS IN SATTERLY LAKE MAP SHEET
27	LACANA EXPLORATION (1981) LTD.	RECONNAISSANCE EXPLORATION IN SATTERLY LAKE MAP SHEET
28	LAC MINERALS LTD.	INDUCED POLARIZATION SURVEY, GEOLOGICAL AND GEOCHEMICAL SURVEYS OF UCHI MINE, EARNGEY TWP.
29	LAKE PONASK GOLD CORP.	GEOLOGICAL AND GEOPHYSICAL SURVEYS IN PONASK LAKE MAP SHEET
30	LOYDEX RESOURCES INC.	MAGNETOMETER SURVEYS IN CASUMMIT LAKE, SATTERLY LAKE AND KEIGAT LAKE MAP SHEETS
31	MAPLE LEAF PETROLEUM LTD.	GEOPHYSICAL, GEOLOGICAL AND GEOCHEMICAL SURVEYS ON SANDERSON OPTION PROPERTY, AND ON EAST SPRINGPOLE PROPERTY, CASUMMIT LAKE MAP SHEET
32	MASSIVE ENERGY LTD.	AIRBORNE AND GROUND GEOPHYSICAL SURVEYS, GEOLOGICAL MAPPING AND DRILLING ON NORANDA OPTION PROPERTY AND SURROUNDING CLAIMS IN BORLAND LAKE MAP SHEET AND FAVOURABLE LAKE MAP SHEET
33	McFINLEY RED LAKE MINES LTD.	UNDERGROUND EXPLORATION ON McFINLEY PROPERTY IN BATEMAN TWP. 25, 000 FT OF DIAMOND DRILLING AND 2, 200 FT OF DRIFTING
34	MONOPROS LTD.	RECONNAISSANCE GEOCHEMICAL SAMPLING IN THE RED LAKE AREA
35	NORANDA EXPLORATION CO. LTD.	DIAMOND DRILLING IN CONFUSION LAKE MAP SHEET GEOCHEMICAL SURVEYS IN LEANO LAKE AND SYDNEY LAKE MAP SHEETS GEOPHYSICAL, GEOLOGICAL AND LITHOGEOCHEMICAL SURVEYS IN GERRY LAKE, LONGLEGGED LAKE AND DIXIE LAKE MAP SHEETS 2, 000 FT OF DIAMOND DRILLING ON ADVANCE RED LAKE PROPERTY IN TODD TWP. GEOLOGICAL AND GEOPHYSICAL SURVEYS AND TRENCHING AND SAMPLING OF JASON MINE, CASUMMIT LAKE MAP SHEET
36	OROFINO RESOURCES LTD.	4, 500 FT OF DIAMOND DRILLING ON THE ORO CLAIM GROUP IN EARNGEY TWP. AND THE JACKSON MANION MINE IN DENT TWP. PROPERTY EXAMINATION OF THE RED SUMMIT PROSPECT, TODD TWP.
37	PELANGIO-LARDER MINES LTD.	GEOPHYSICAL SURVEY IN WESLEYAN LAKE MAP SHEET
38	PETERSON, CHARLES W.	DIAMOND DRILLING, STRIPPING, TRENCHING, ROAD CONSTRUCTION AND SURVEYING OF EIGHT CLAIMS IN HEYSON TWP.
39	REDAURUM RED LAKE MINES LTD.	AIRBORNE GEOPHYSICAL SURVEYS, GROUND GEOPHYSICAL SURVEYS AND DIAMOND DRILLING IN HEYSON TWP.
40	ROCKSPAN RESOURCES LTD.	DIAMOND DRILLING ON SILVER SPIRIT MINES PROPERTY, BUCKETT LAKE MAP SHEET
41	ST. JOE CANADA INC.	DIAMOND DRILLING ON HORSESHOE ISLAND AND GREENCAMP SHOWING IN CASUMMIT AND SATTERLY LAKE MAP SHEETS

EXPLORATION ACTIVITY

The Red Lake Mining Division is currently undergoing the second highest level of exploration activity since 1955. This level has been surpassed only by that which occurred in 1970, shortly after the discovery of the South Bay base-metal deposit. The only other time when exploration activity may have been more active was during the initial staking rush of 1926. Although the staking level was high in 1926, the amount of work performed cannot be accurately determined.

This current activity is centred in two areas: grass roots dominated exploration in the Birch Lake area; and surface and underground exploration of past producers and prospects in the Red Lake area. Activity in the Confederation Lake area is not as intense and consists of re-examination of past producers as well grass roots exploration. Except for two mining companies which are looking for base metals and gold, all exploration programs are gold oriented.

Four underground exploration programs were active in Red Lake in 1985.

At the Rowan Lake mine, Goldquest Exploration Incorporated drilled 51 holes for a total of 14 895 feet. Within the main vein, 49 500 tons of ore grade material has now been outlined. The grade is 0.74 ounce gold per ton (uncut) and 0.42 ounce gold per ton (cut). Production from this site is dependent on road development, access to hydroelectric power, and the price of gold.

Jamie Frontier Resources Incorporated drilled just over 100 holes, totaling approximately 16 000 feet at the Mount Jamie mine. Results, as reported by The Northern Miner over the year have been encouraging. This drilling has added to the reserves which are in excess of 20 000 tons, grading 0.87 ounce gold per ton over an average width of 4 feet (The Northern Miner, May 2, 1985).

Esso Minerals Canada, after completing more than 50 000 feet of diamond drilling, suspended underground exploration in October at the Wilanour Resources Limited property. The underground drilling program tested the possible down dip extensions of the Annco Zone and the Wilmar Breccia Zone. Drilling consisted of long holes (in excess of 2000 feet) below the 2050-foot level. Although the holes intersected the mineralized zones, the results are considered uneconomic by the company. A 10 000-foot surface diamond drilling program tested several targets and was completed in December. Esso Minerals Canada now has in excess of a 60% working interest in the mineral rights.

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 2.2

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1985	2, 673	2, 260	8, 212	42, 000	201, 052	16, 642	269, 262
1984	4, 344	1, 725	7, 799	32, 588	78, 538	12, 495	128, 664
1983	2, 407	1, 204	5, 180	18, 637	22, 035	3, 468	53, 207
1982	942	1, 884	3, 992	23, 967	79, 662	6, 787	118, 775
1981	1, 719	1, 249	4, 889	28, 771	66, 000	8, 182	107, 430
1980	2, 220	1, 115	4, 301	38, 482	30, 240	871	71, 975
1979	1, 068	1, 763	3, 221	21, 108	38, 380	3, 154	62, 949
1978	1, 207	1, 521	3, 916	25, 574	19, 496	2, 480	50, 997
1977	2, 324	2, 395	4, 261	12, 994	45, 080	620	59, 196
1976	2, 705	1, 382	4, 332	18, 680	23, 578	380	46, 544
1975	1, 368	2, 059	2, 957	29, 377	12, 714	960	44, 717
1974	1, 339	1, 829	3, 648	47, 362	5, 660	3, 040	57, 719
1973	1, 616	3, 157	4, 009	60, 027	20, 474	NIL	83, 019
1972	2, 219	5, 284	5, 588	34, 261	14, 858	5, 216	56, 173
1971	1, 541	4, 922	8, 486	73, 019	50, 920	2, 243	127, 556
1970	3, 971	7, 194	11, 759	73, 886	329, 065	17, 606	427, 527
1969	10, 999	933	14, 772	49, 212	66, 032	1, 320	119, 039
1968	2, 451	1, 702	4, 784	15, 367	48, 800	1, 228	65, 395

McFinley Red Lake Mines Limited, in partnership with Phoenix Gold Mines Limited (42.9%) and the Coniagas Mines Limited (7.1%), continued to explore its property. Approximately 25 000 feet of diamond drilling and 2200 feet of drifting was done on the 150- and 400-foot levels. Several potential ore lenses have been identified and drifting often encounters high grade gold mineralization (The Northern Miner, October 21, 1985).

Outside the Red Lake area, other past producers are being evaluated. Lac Minerals Limited is exploring the Uchi Mine, east of Confederation Lake. Their program in 1985 consisted of an I.P. survey, soil sampling, geologic mapping, and relogging drill core. West of Confederation Lake, Orofino Resources Limited has been drilling on the Jackson-Manion Mine. Noranda Incorporated is examining the Jason (Argosy) mine area on Casummit Lake, with a program consisting of a magnetometer survey, trenching, sampling, and geologic mapping.

Several properties in the Red Lake area were drilled in 1985. The most extensive drilling program was carried out by Goldquest Exploration Incorporated on four of its properties. The Inore group had 16 holes for a total of 8041 feet; the Abino property had 8 holes for a total of 4957 feet; the South East group had 3 holes for a total of 2011 feet; and the Kilbarry property had 5 holes for a total of 2696 feet.

Campbell Red Lake Mines Limited drilled 15 000 feet on the adjacent Craibbee-Fletcher property and reported no values of economic significance.

Outside the Red Lake area, several drilling programs were carried out. Dome Mines Limited drilled in Corless and Honeywell Townships and in the Birch-Angela Lakes area. Massive Energy Limited drilled on its Borland Lake property. St. Joe Canada Incorporated did 7792 feet of drilling on their Horseshoe Island prospect and on occurrences in the vicinity of South Bay of Birch Lake. BP Selco has drilled 11 holes for a total of 3964 feet at 5 locations from Bruce Lake to Birch Lake. Eldor Resources Limited has done 575 feet of drilling on the Kippen Lake property; Noranda Incorporated has drilled on the Dixie Lake area property; and Golden Terrace Resources Corporation has drilled their property at Casummit Lake.

A joint venture partnership with Temulac Holdings as the operator began tailings reclamation in Madsen. To date, they have processed the overflow pond next to the Madsen mill and have run a five-ton test sample from the main tailings ponds with satisfactory results. Reclamation of the tailings pond will continue in Spring, 1986.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

A.J. Andrews and H. Hugon (University of Toronto) continued their study of the relationships of gold mineralization to metamorphism, alteration, and structure. After several years of investigating regional relationships, this year's emphasis was on the Arthur W. White and Campbell Red Lake Mines.

A.J. Fyon and L. Lane commenced a two-year study of gold mineralization in the Confederation Lake area. Initial emphasis was on regional alteration patterns and structural relationships, and a detailed documentation of past producers.

Gary P. Beakhouse mapped the western half of the Birch Lake area while D.J. Good mapped the

TABLE 2.3

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM	AIRBORNE ELECTROMAGNETIC SURVEY
AG	SILVER
AMAG	AIRBORNE MAGNETOMETER SURVEY
ASSESS	ASSESSMENT
AU	GOLD
DDH	DIAMOND DRILL HOLE (NO) FOOTAGE
EM	ELECTROMAGNETIC SURVEY
GEOCHEM	GEOCHEMICAL SURVEY
GL	GEOLOGICAL SURVEY
HLEM	HORIZONTAL LOOP ELECTROMAGNETIC SURVEY
IP	INDUCED POLARIZATION SURVEY
L-GEOCHEM	LITHOGEOCHEMICAL SURVEY
MAG	MAGNETOMETER SURVEY
NON-ASSESS	NON ASSESSMENT
OVD	OVERBURDEN DRILLING
PEM	PULSE ELECTROMAGNETIC SURVEY
rTr	ROCK TRENCHING
Str	STRIPPING, SOIL SAMPLING
VLF-EM	VERY LOW FREQUENCY ELECTROMAGNETIC SURVEY

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
AVIS LAKE, CURIE LAKE	52K/16	GETTY CANADIAN METALS LTD.	AU	ASSESS	MAG, EM	1984	2.8235	76-85
AVIS LAKE, CURIE LAKE	52K/16	GETTY CANADIAN METALS LTD.	AU	ASSESS	GL	1984	2.7520	70-84
AVIS LAKE, CURIE LAKE	52K/16	GETTY CANADIAN METALS LTD.	AU	ASSESS	GL	1985	2.8224	94-85
AVIS LAKE, CURIE LAKE	52K/16	GETTY CANADIAN METALS LTD.	AU	ASSESS	rTr	1985		96-85
BAIRD TWP.	52K/13	REDAURUM RED LAKE MINES LTD.	AU	ASSESS	MAG, EM	1984	2.8382	97-85
BAIRD TWP.	52K/13	REDAURUM RED LAKE MINES LTD.	AU	ASSESS	DDH(2)-714'	1984		119-85
BALL TWP.	52M/1	BIRON BAY RESOURCES LTD.	AU	ASSESS	VLF-EM	1984	2.7895	5-85
BALMER TWP.	52N/4	COMINCO LTD.	AU	ASSESS	OVD	1985	2.8614	128-85
BALMER TWP.	52N/4	DUNLOP, W.B.	AU	ASSESS	EM, GEOCHEM	1985	2.8434	126-85
BALMER TWP. BATEMAN TWP.	52N/4	GOLDQUEST EXPLORATIONS INC.	AU	ASSESS	GL	1983	2.7616	68-84
BALMER TWP. BYSHE TWP.	52N/4 52K/13	GOLDQUEST EXPLORATIONS INC.	AU	ASSESS	DDH(3)-2202'	1985		113-85
BATEMAN TWP.	52N/4	GOLDQUEST EXPLORATIONS INC.	AU	ASSESS	GL	1982	2.7645	67-84
BORLAND LAKE	53D/16	MASSIVE ENERGY LTD.	AU, AG	ASSESS	AMAG, AEM	1985	2.8527	103-85
BOWERMAN TWP.	52K/15	GETTY CANADIAN METALS LTD.	AU	ASSESS	AMAG, AEM	1983	2.7518	60-84
BUCKETT LAKE HEWITT LAKE	53C/10 53C/7	BP RESOURCES CANADA LTD.	AU	ASSESS	MAG, VLF-EM	1985	2.8330	62-85
CANNON LAKE	52O/11	KERR ADDISON MINES LTD.	AU	ASSESS	GL	1984	2.7603	2-85
CANNON LAKE	52O/11	KERR ADDISON MINES LTD.	AU	ASSESS	GL	1984	2.7686	4-85
CANNON LAKE	52O/11	KERR ADDISON MINES LTD.	AU	ASSESS	L-GEOCHEM	1984	2.8022	35-85
CANNON LAKE	52O/11	KERR ADDISON MINES LTD.	AU	ASSESS	GL	1984	2.8023	36-85
CASUMMIT LAKE	52N/8	CRAWFORD, H.A.	AU	ASSESS	MAG, EM	1985	2.8030	46-85
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(9)-4443'	1984		26-85
CASUMMIT LAKE KEIGAT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, EM	1985	2.8253	55-85
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, EM	1985	2.8111	56-85
CASUMMIT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(1)-473'	1985		125-85
CASUMMIT LAKE McVICAR LAKE, MEEN LAKE SKINNER TWP.	52N/8 52O/11, 6 52N/2	DURATION MINES LTD. WILSHIRE RESOURCES LTD.	AU	ASSESS	MAG, VLF-EM	1984	2.7543	57-84
CASUMMIT LAKE BROWNSTONE LAKE	52N/8 52N/9	GOLDEN MAVERICK RESOURCES CORP.	AU	ASSES	AMAG, AEM	1985	2.8450	77-85
CASUMMIT LAKE	52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	MAG, EM	1985	2.8544	112-85
CASUMMIT LAKE	52N/8	GOLD FIELDS CANADIAN MINING LTD.	AU	ASSESS	AMAG, AEM	1985	2.8565	116-85
CASUMMIT LAKE	52N/8	HEINRICH, BRADLEY L.	AU	ASSESS	DDH(1)-103', Str	1984		61-85 62-85

TABLE 2.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
CASUMMIT LAKE	52N/8	HODGSON, RAND	AU	ASSESS	GL	1985	2.8393	74-85
CASUMMIT LAKE	52N/8	HODGSON, RAND	AU	ASSESS	GL	1985	2.8394	121-85
CASUMMIT LAKE	52N/8	HODGSON, RAND	AU	ASSESS	GL	1985	2.8395	68-85
CASUMMIT LAKE	52N/8	HODGSON, RAND	AU	ASSESS	SA	1985	2.8639	144-85
CASUMMIT LAKE	52N/8	HODGSON, RAND	AU	ASSESS	GL	1985	2.8397	69-85 120-85
CASUMMIT LAKE	52N/8	KOSTYNUK, ALEX	AU	ASSESS	rTr	1985		64-85
CASUMMIT LAKE SHABUMENI LAKE LITTLE SHABUMENI LAKE	52N/8 52N/7	LABRADOR MINING AND EXPLORATION CO.	AU	ASSESS	AMAG, AEM	1985	2.8208	67-85
CASUMMIT LAKE	52N/8	LOYDEX RESOURCES INC.	AU	ASSESS	MAG	1985	2.8138	48-85
CASUMMIT LAKE SATTERLY LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(4)-2872'	1984		10-85
CASUMMIT LAKE SATTERLY LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(8)-3414'	1985		122-85
CONFUSION LAKE LONGLEGGED LAKE	52L/9 52K/12	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	AMAG	1984	2.7545	52L/NE
CONFUSION LAKE	52L/9	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	DDH(1)-353'	1985		82-85
CORLESS TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG	1984	2.7543	80-84
CORLESS TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	EM	1985	2.8270	81-85
CORLESS TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(1)-500'	1985		155-85
CORLESS TWP. DENT TWP. GOODALL TWP.	52N/2	SHERRITT GORDON MINES LTD.	AU	ASSESS	GL, L-GEOCHEM	1983 1984	2.7090	38-84
CURIE LAKE	52K/16	GETTY CANADIAN METALS LTD.	AU	ASSESS	GEOCHEM, L-GEOCHEM	1985	2.8223	95-85
DENT TWP.	52N/2	DEVONSHIRE GOLD RESOURCES INC.	AU	ASSESS	DDH(3)-1501'	1984		28-85
DENT TWP.	52N/2	HAMES,MARSHALL, DEVONSHIRE GOLD RESOURCES INC.	AU	ASSESS	I.P. L-GEOCHEM DDH(11)-2862'	1983	2.6747	30-84 37-84
DENT TWP. MITCHELL TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	GL, GEOCHEM	1983 1984	2.7821	21-85
DIXIE LAKE FAULKENHAM LAKE SOUTH OF BYSHE AND WILLANS TWP.	52K/NW	GOLDEN TERRACE RESOURCES CORP.	AU	ASSESS	AMAG, AEM	1985	2.8329	63-85
FAIRLIE TWP.	52N/4	HOMESTAKE MINERAL DEVELOPMENT CO.	AU	ASSESS	MAG, VLF-EM	1985	2.8343	84-85
FAIRLIE TWP.	52N/4	HOMESTAKE MINERAL DEVELOPMENT CO.	AU	ASSESS	AMAG, AEM	1985	2.8623	108-85
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(1)-920'	1984		23-85
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	MAG, EM	1984	2.7933	31-85
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(CREDITS)	1984		86-85
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(1)-490'	1984		104-85
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(1)-127'	1984		152-85
GERRY LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	MAG, VLF-EM	1985	2.8604	154-85
GOODALL TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	NON-ASSESS	L-GEOCHEM, GL	1985		GOODALL

TABLE 2.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
HAMMELL LAKE (TODD TWP.)	52M/1	GIBSON, ROBERT	AU	ASSESS	Str. DDH(10)-1029'	1984		95-84
HAMMELL LAKE (TODD TWP.)	52M/1	GIBSON, ROBERT	AU	ASSESS	Str. DDH(2)-204'	1985		149-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	DDH(1)-652'	1984		7-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	L-GEOCHEM	1984	2.7690	8-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	MAG, HLEM	1983	2.7689	9-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	L-GEOCHEM	1983	2.7688	10-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	GEOCHEM	1984	2.7691	12-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	Str.	1984		15-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	DDH(2)-1161'	1984		42-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	GEOCHEM	1984	2.8010	43-85 44-85
HAMMELL LAKE (TODD TWP.)	52M/1	GOLDQUEST EXPLORATION INC.	AU	ASSESS	DDH(1)-647'	1985		101-85
HAMMELL LAKE (TODD TWP.)	52M/1	KEELEY FRONTIER RESOURCES LTD.	AU	NON-ASSESS	GL, DDH	1983	63.4233	52M/SE
HAMMELL LAKE (TODD TWP.)	52M/1	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	MAG	1983	2.8086	39-85
HAMMELL LAKE (TODD TWP.)	52M/1	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	GEOCHEM	1985	2.8353	66-85
HAMMELL LAKE (TODD TWP.)	52M/1	RIVARD, DANNY	AU	ASSESS	DDH(4)-355'	1984		75-85
HEYSON TWP.	52K/13	REDAURUM RED LAKE MINES LTD.	AU	ASSESS	AMAG, AEM	1985	2.8400	107-85
HONEYWELL TWP. McNAUGHTON TWP.	52N/2 52N/1	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG	1984	2.7542	79-84
HONEYWELL TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(2)-908'	1985		156-85
JUBILLEE LAKE AVIS LAKE CURIE LAKE SLATE LAKE ROADHOUSE RIVER	52N/1 52K/16 52K/15 52J/13	GETTY CANADIAN METALS LTD.	AU	ASSES	MAG, HLEM	1984	2.8277	117-85
JUBILLEE LAKE AVIS LAKE CURIE LAKE SLATE LAKE ROADHOUSE RIVER	52N/1 52K/16 52K/15 52J/13	GETTY CANADIAN METALS LTD.	AU	ASSESS	GL, GEOCHEM	1984	2.8278	118-85
KARAS LAKE SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	PEM	1984	2.7929	17-85
KARAS LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(1)-551'	1985		91-85
KARAS LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	MAG, VLF-EM	1985	2.8423	92-85
KEIGAT LAKE	52N/8	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG, HLEM	1985	2.8017	45-85
KEIGAT LAKE	52N/8	LOYDEX RESOURCES INC.	AU	ASSESS	MAG	1985	2.8140	90-85
KIPPEN LAKE	53G/5	ELDOR RESOURCES LTD.	AU	ASSESS	GEOCHEM	1984	2.7405	64-84
KIPPEN LAKE	53G/5	ELDOR RESOURCES LTD.	AU	ASSESS	DDH(1)-575'	1985		51-85
LEANO LAKE SYDNEY LAKE	52L/16 52L/9	NORANDA EXPLORATION COMPANY LTD.	BASE METALS	ASSESS	MAG, HLEM	1984	2.8236	53-85
LEANO LAKE SYDNEY LAKE	52L/16 52L/9	NORANDA EXPLORATION COMPANY LTD.	BASE METALS	ASSESS	L-GEOCHEM	1984	2.8250	54-85
LINGMAN LAKE	53J/15	KENNCO EXPLORATION (CANADA) ltd.	AU	ASSESS	MAG, VLF-EM, GL, L-GEOCHEM	1984	2.7881	3-85

TABLE 2.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McNAUGHTON TWP.	52N/1	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(2)-962'	1985		106-85
McVICAR LAKE	520/11	KERR ADDISON MINES LTD.	AU	ASSESS	GL	1984	2.7677	6-85
McVICAR LAKE	520/11	KERR ADDISON MINES LTD.	AU	ASSESS	L-GEOCHEM	1984	2.8025	34-85
McVICAR LAKE	520/11	NORANDA EXPLORATION COMPANY LTD.	AU	ASSESS	GL, VLF-EM	1984	2.7219	52-84 54-84
NANGO LAKE	53B/6	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	DDH(7)-1594'	1984		59-85
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	MAG, EM, VLF-EM	1984	2.7508	75-84
PONASK LAKE	53F/15	LAKE PONASK GOLD CORP.	AU	ASSESS	GL	1984	2.7944	32-85 33-85
RAHILL LAKE	53F/2	BORTWICK, J.S.	AU	ASSESS	MAG, VLF-EM	1985	2.8338	60-85
SATTERLY LAKE	52N/8	COMINCO LTD.	AU	ASSESS	MAG, EM	1985	2.7984	29-85
SATTERLY LAKE	52N/8	KIDD CREEK MINES LTD.	AU	ASSESS	AMAG	1984	2.8233	52-85
SATTERLY LAKE	52N/8	LABRADOR EXPLORATION (ONTARIO) LTD.	AU	ASSESS	DDH(7)-1771'	1984		41-85
SATTERLY LAKE	52N/8	LABRADOR MINING AND EXPLORATION CO. LTD.	AU	ASSESS	GL, GEOCHEM, L-GEOCHEM	1984	2.8011	38-85
SATTERLY LAKE	52N/8	LACANA EXPLORATION (1981) INC.	AU	ASSESS	AMAG, AEM	1984	2.8524	127-85
SATTERLY LAKE	52N/8	LOYDEX RESOURCES INC.	AU	ASSESS	MAG	1985	2.8139	47-85
SATTERLY LAKE SHABUMENI LAKE	52N/8	LOYDEX RESOURCES INC.	AU	ASSESS	MAG	1985	2.8240	49-85
SATTERLY LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(1)-827'	1985		1-85
SATTERLY LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(1)-348'	1985		57-85
SATTERLY LAKE	52N/8	ST. JOE CANADA INC.	AU	ASSESS	DDH(1)-331'	1985		145-85
SEAGRAVE LAKE	52N/8	BP RESOURCES CANADA LTD.	BASE METALS	NON-ASSESS	MAG, HLEM	1985		52N/SE/8
SEAGRAVE LAKE	52N/8	BP RESOURCES CANADA	BASE METALS	ASSESS	DDH(5)-1396'	1985		105-85
SHABUMENI LAKE	52N/7	LABRADOR EXPLORATION (ONTARIO) LTD.	AU	ASSESS	DDH(2)-866', MAG	1984		58-85
SHABUMENI LAKE	52N/7	HODGSON, RAND	AU	ASSESS	GEOLOGICAL	1985	2.8396	71-85 111-85
SHABUMENI LAKE	52N/7	HODGSON, RAND	AU	ASSESS	L-GEOCHEM	1985	2.8640	143-85
SHABUMENI LAKE	52N/7	TRIPPIER, TED	AU	ASSESS	VLF-EM	1984	2.7642	90-85
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(1)-907'	1984		82-84 24-85
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(2)-1094'	1984		37-85
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(1)-502'	1985		87-85
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	DDH(3)-1291'	1984 1985		88-85
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	BASE METALS	ASSESS	MAG, VLF-EM	1985	2.8430	89-85
SOUTH OF OTTER LAKE	52K/14	BP RESOURCES CANADA LTD.	AU	ASSESS	DDH(2)-1827'	1984		73-84 78-84
SYDNEY LAKE	52L/9	NORANDA EXPLORATION COMPANY LTD.	BASE METALS	ASSESS	GL	1984	2.8292	40-85
SYDNEY LAKE	52L/9	NORANDA EXPLORATION COMPANY LTD.	BASE METALS	ASSESS	DDH(5)-921'	1984		99-85
UCHI LAKE & EARNGEY TWP.	52N/2	DOME EXPLORATION (CANADA) LTD.	AU	ASSESS	MAG	1984	2.7541	81-84
UCHI LAKE & EARNGEY TWP.	52N/2	OROFINO RESOURCES LTD.	AU	ASSESS	GL, GEOCHEM	1983 1984	2.7822	22-85
WESLEYAN LAKE	520/4	PELANGIO-LARDER MINES LTD.	AU	ASSESS	VLF-EM	1985	2.8414	124-85

eastern half. This project will be completed in 1986 when the area north of Birch Lake is mapped.

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3. Sioux Lookout Resident Geologist Area, Northwestern Region

D.A. Janes

Resident Geologist, Ontario Ministry of Northern Development and Mines, Sioux Lookout

INTRODUCTION

The Sioux Lookout office is presently staffed by D.A. Janes, Resident Geologist and M.O. Sawtelle, Geological Secretary. The position of Resource Geologist is vacant. Mr. Roy Sooner is the Mining Recorder for the Patricia Mining Division and Mrs. D. Cosco is the Chief Clerk.

During 1985, a number of contract staff were employed in a variety of tasks. Mr. R.J. Redden was employed as geologist to prepare Geological Data Inventory Folios. Students, C. Bath and J. Burnell, carried out various office and field duties during the summer months. Mr. B. Bowen and two assistants conducted a drill core retrieval program during the Spring and Fall of the year. This program is jointly funded by Employment and Immigration Canada and the Ontario Ministry of Natural Resources, under the Resources Sector Work Program.

Mr. Richard Trotter conducted an evaluation of geophysical methods for aggregate exploration and inventory in the vicinity of the town of Sioux Lookout. This study was designed to develop efficient, locally applicable exploration techniques in areas of limited coarse aggregate supply.

Mineral exploration activity in the Patricia Mining Division continues the trend of the past two years in that most work is directed towards gold exploration (Figures 3.1 and 3.2). Activity in the Pickle Lake area is most intense and is centred around Dome Mines' Dona Lake project. The North Caribou Volcanic Belt is also very active with most work done on the Agutua Arm and Opapimiskan Lake areas. A considerable amount of exploration has been done north of Lake St. Joseph, between the Obaskaka Lake Pluton and Bancroft Lake to the east. Several programs were carried out in the Fry-Bamaji Lakes area. Less intense but significant activity continues on north Sturgeon Lake and on Minnitaki Lake in the vicinity of Goldlund Mine. Programs directed toward platinoid metals have been started in the north of the Division.

The Mattabi and Lyon Lake Mines on Sturgeon Lake continued in Froduction through 1985. Thierry Mine (UMEX Incorporated) at Pickle Lake remained in care and maintenance during 1985. Goldlund Mine in Echo Township shut down in the Spring of 1985. The mill is intact and could be reactivated quickly. The Musselwhite Consortium (Dome Mines operator) completed their underground evaluation of the Opapimiskan Lake property. The decline is bulkheaded and has been allowed to flood. Dome Mines Limited continued advanced exploration on their Dona Lake property near Pickle Lake and are sinking shaft as this report is written.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist's program was constrained during 1985 by the lack of a Resource Geologist, the absence of a trained geological secretary during the field season, and generally deplorable weather across the northwest of Ontario. These factors limited field time and reduced other activities.

All operating and shut-down mines within the Division were visited at least once. Two weeks were spent on visits to Sturgeon Lake and Minnitaki Lake properties. One week was spent on a visit to Wunnummin Lake in company with G. Stott and H. Wallace of the Ontario Geological Survey. The results of this visit are reported *in* Stott and Janes (1985).

Core cataloguing was done for the Sioux Lookout core retrieval program. At year end, approximately 30 500 m of exploration core was stored securely at a temporary facility in Sioux Lookout. Most of this core will be moved to the Regional Core Library in Kenora when completed.

Several lectures were given at local secondary schools by the Resident Geologist. Two Junior Ranger lectures and field trips were held. The Geological staff developed and presented a display at the Blueberry Festival, an annual trade fair in Sioux Lookout.

The Resident Geologist participated in a field trip for the Institute of Lake Superior Geology in May, 1985. Several papers dealing with local geology were co-authored with members of the Ontario Geological Survey and the Ontario Centre for Remote Sensing.

To partially replace a resident economic geologist, the Sioux Lookout office partially funded an economic geologist for an Ontario Geological Survey party which mapped a portion of Lake St. Joseph. This work is reported in Kay and Stott (1985).

Technical and logistical support was provided to several graduate students of the University of North Dakota. They are conducting studies on a gold property in the Wabigoon Volcanic Belt and studies on metamorphism in the English River Gneissic Subprovince. Three graduate theses have resulted from these studies and two others are in progress.

ONTARIO GEOLOGICAL SURVEY MAPPING PROGRAMS

The Ontario Geological Survey carried out two major programs within the Patricia Mining Division during 1985. The larger program, a multidisciplinary study of the North Caribou Lake Volcanic Belt, is in the second year of a three-year program. The coordinated study includes Precambrian mapping at the one inch to quarter mile scale, detailed mapping of mineral deposits and Pleistocene mapping. This program is integrated with geophysical and isotopic age studies. Current results are summarized in F.W. Breaks *et al.* (1985) and in Piroshco and Shields (1985).

The results to date of this program have been very interesting, and more importantly, have provided the basis for a number of well conceived exploration programs throughout the area. While exploration may have occurred without this program, it provided an opportunity to bypass much of the "grass-roots" phase and to progress to property and detailed exploration.

The second Precambrian mapping program was located in the Lake St. Joseph portion of the Uchi Volcanic Subprovince and was led by G. Stott. This work is part of a multi-year program to map the Uchi Volcanic Province within the Patricia Mining Division. While not as broadly based as the North Caribou project, it has integrated economic and geophysical studies and has had a considerable stimulative effect on exploration in the area.

MINING ACTIVITY

Mattabi Mines Limited and Noranda Mines Limited, Lyon Lake Division, are located on Sturgeon Lake. The Mattabi Mine is owned by Noranda Mines Limited (60%) and Abitibi-Price Incorporated (40%). Ore from both the Lyon Lake and Mattabi Mines is processed at the Mattabi mill to produce zinc, copper, and lead concentrates. Production was down from 1983-1984 levels due, in part, to a strike during the Summer of 1985. The mine is projected to employ 350 workers in 1986 and will mill approximately one million tons, 60% of which will be mined at Mattabi and the remainder at Lyon Lake.

Thierry Mine (UMEX Incorporated) at Pickle Lake remained under care and maintenance during 1985. The mine formerly produced copper-nickel concentrate from a high grade zone in a layered mafic complex. Gold, silver, and platinoid values were present in the concentrate.

Goldlund Mine in Echo Township shut down in the Spring of 1985. During shut-down, the mill produced a combined gravity-float gold concentrate from a mill rated from 300 to 400 tons per day. A smaller, parallel circuit was capable of producing 100 tons per day and was dedicated to custom milling. The mill produced in excess of 15 000 troy ounces of gold in approximately 1 1/2 years of production from one level, serviced by decline and from a small open pit. The mine exhausted developed ore and was unable to raise funds to continue with underground development. The underground machinery was removed and the mill mothballed before shut-down.

DEVELOPMENT PROJECTS

The Musselwhite Consortium (Dome Mines operator) completed a decline on their Opapimiskan Lake property during 1984. Underground mapping and bulk sampling studies indicated a mineral inventory of some three million tons of gold-bearing iron formation. The grade was not considered economic at present prices. The Consortium carried out a drilling program in 1985 to evaluate new zones. The decline was sealed off and allowed to flood.

Dome Mines continued exploration of their Dona Lake property, 11 km south of Pickle Lake. The mineralization is gold contained in sulphide zones within folded altered iron formation. Dome Mines reported a drill-indicated ore reserve of 1.3MM short tons at 0.22 troy ounce per ton. A work site was cleared in 1985. It is intended to sink to 175 m with drifts at the 100- and 160-metre levels. A bulk sample will be taken for metallurgical tests and grade estimation. The development is very favourably sited near the town of Pickle Lake, can be serviced by electricity form the existing grid, and should have no problem housing employees.

MINERAL EXPLORATION ACTIVITY

The past year has been a very good one for exploration in Patricia Mining Divison (Tables 3.1 and 3.2). Total man days of assessment credit reported for 11 months will match the peak year of 1981 and the exploration expenditures will exceed 12 million dollars (Table 3.3). While claim staking is down compared to 1983-1984, the claims active should be near the 10 000 mark. Diamond drilling days reached a 12-year high and other exploration indicators are at high levels. Considering that very little base-metals exploration has been done, these are excellent results. An encouraging aspect of exploration in the Patricia Mining Division is that a large portion of exploration is taking place in the northern, less accessible belts such as Big Trout Lake, North Caribou Lake, and the Uchi Subprovince. This trend is due to the recognition of the potential of iron formation related gold mineralization. Another contributing factor is a good mixture of seasoned major mining companies and highly active junior exploration groups, largely based on the Vancouver Exchange.

Unfortunately, base-metal exploration remains at a very low level. Cumberland Resources Limited and UMEX Incorporated continued exploration in the Evans Lake base-metal area. UMEX Incorporated carried out dual purpose exploratory studies in several areas and several companies did exploratory work in the Meen Lake, Fry Lake, and Dempster Lake areas. However, the total is <10% of the effort expended on precious metals.

Some renewed interest was shown in the platinoid metals. One drilling project was done in late fall on the Big Trout Lake layered complex, but results have not been released. Little, if any, exploration for granitoid based mineralization was done in 1985.

The influence of the Ontario Mineral Assistance Program is shown in many of the northern based gold exploration programs. Table 3.4 indicates the number of programs based widely but predominantly in the northern portion of the mining division. Approximately 5 million dollars of eligible expenditures are involved with a possible pay-back of 1.25 million dollars. Taking into account that only non-producing companies are eligible, the amounts are impressive.

Several groups and companies have been especially active in the Pickle Lake and North Caribou Lake areas. Companies associated with Mr. H. Hodge, such as Van Horne Gold Exploration Incorporated and Moss Resources Limited, have put together a grass-roots exploration program in the Pickle Lake, North Caribou Lake, and Bancroft Lake areas. The companies have acquired and worked on known occurrences and discovered new areas of gold mineralization, largely based on shear zone hosted and iron formation related deposits. This is the third year that these associated companies have mounted major programs and a number of their properties have been drill tested. The most interesting program to

Figure 3.1
SIOUX LOOKOUT RESIDENT GEOLOGIST AREA

EXPLANATION

● **Producing Mines**
1. Mattabi Mines Limited. . . . Zn, Cu, Pb, Ag
2. Noranda Mines Limited (Lyon Lake Division) . . . . Zn, Cu, Pb, Ag

○ **Mills**
1. UMEX Incorporated
2. Corporation Falconbridge Copper
3. Goldlund Mine

◑ **Property Under Development**
1. Musselwhite Consortium (Dome Mines Ltd.)
2. Dome Exploration (Canada) Limited
3. Camreco Incorporated

• Exploration Activity in 1985 (keyed to TABLE 3.1)

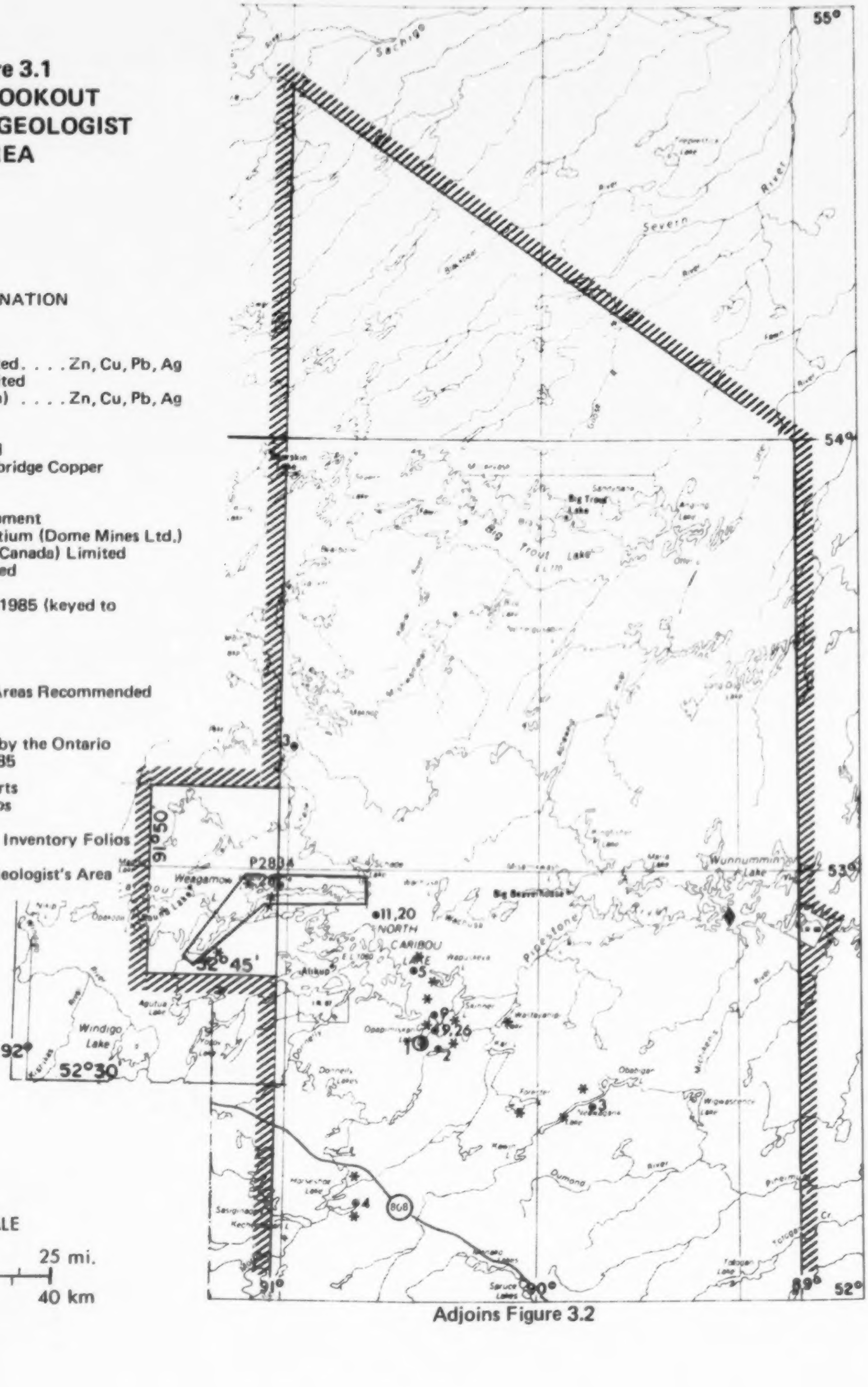
* Assessment Work Filed

♦ Property Visits and/or Areas Recommended for Exploration

═ Maps or Reports Issued by the Ontario Geological Survey in 1985

OFR - Open File Reports
P - Preliminary Maps
2443 - Coloured Maps
G - Geological Data Inventory Folios

▨ Boundary of Resident Geologist's Area


55°
Sachigo
Severn
River
54°
Big Trout Lake
53°
Wunnummin Lake
91°50'
P2834
Weagamow Lake
•11,20
NORTH CARIBOU LAKE
Big Beaverhouse
Pipestone
52°45'
•5
9
19,26
1
2
3
Windigo Lake
92°
52°30'
•4
808
91°
90°
89°
52°

SCALE
0 25 mi.
0 20 40 km

Adjoins Figure 3.2

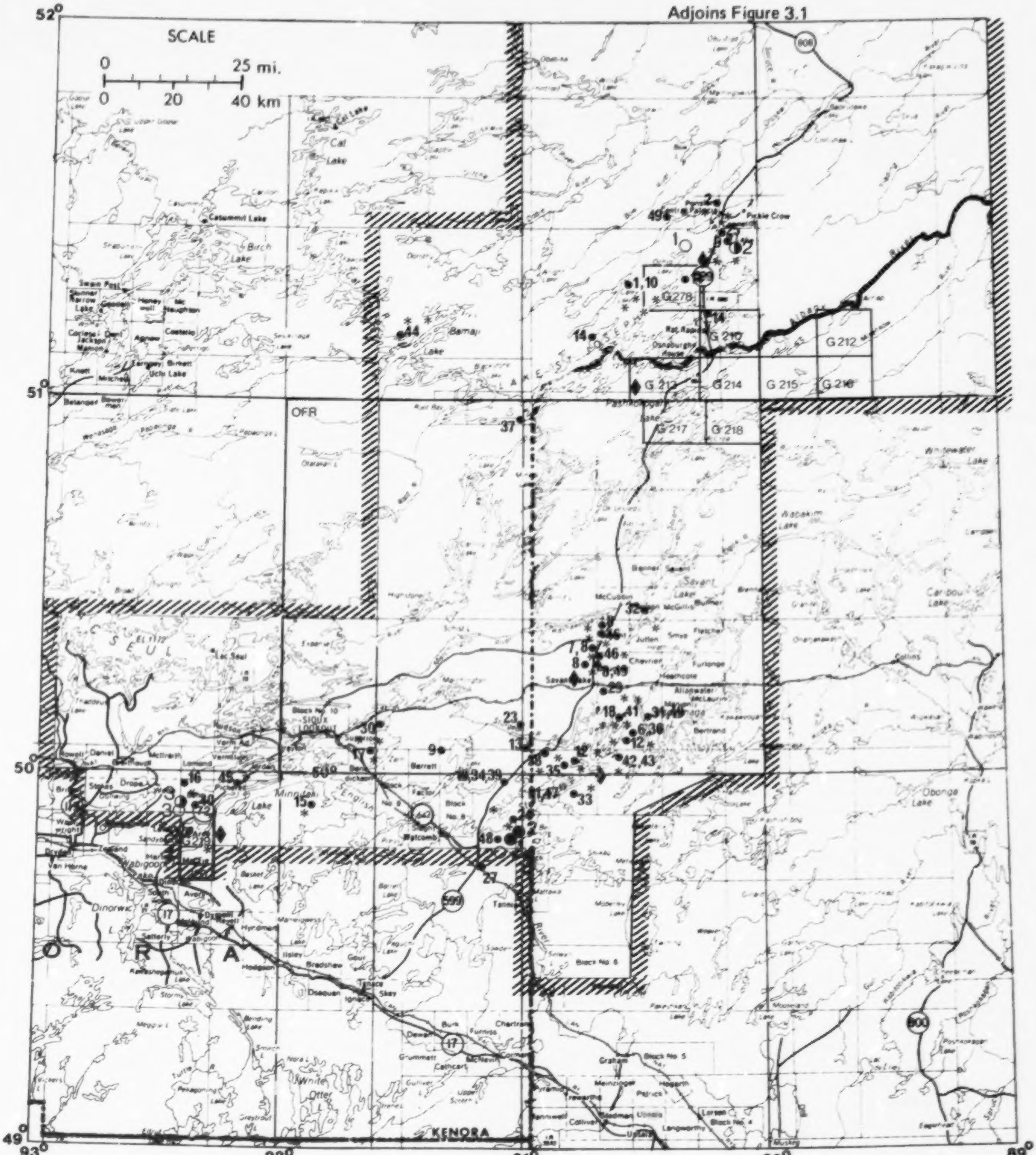

52°
Adjoins Figure 3.1
SCALE
0
25 mi.
0
20
40 km
Cat Lake
Birch Lake
Casummit Lake
Pickle Crow
G 278
G 210
G 212
G 213
G 214
G 215
G 216
G 217
G 218
Bamaji Lake
51°
OFR
Whitewater Lake
Wabakimi Lake
Savant Lake
Caribou Lake
SIOUX LOOKOUT
Minnitaki Lake
50°
Obonga Lake
Dinorwic
Wabigoon
17
599
800
Block No. 6
Block No. 5
Block No. 4
White Otter Lake
KENORA
49°
93°
92°
91°
90°
89°

Figure 3.2
SIOUX LOOKOUT
RESIDENT GEOLOGIST
AREA

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 3.1

Number on Figure	Individual or Company	Activity
1	Amoco Canada Petroleum C. L.	Duffell Lake - DD-10-3392' in 1984
2	Best, Allan	Tarp Lake - DD-1-402' in 1985; Zeemel Lake - Manual and Mechanical work in 1985
3	Canadian Nickel C. L.	Makoop River - DD in 1972 (Drill Logs in Red Lake); Neawagank Lake - DD-7-1668' in 1982
4	Canadian Occidental Petroleum L.	Wapamisk Creek - Tr in 1982
5	Cominco L.	Akow Lake - OVD in 1982
6	Copconda York Resources Inc.	Squaw Lake - Humus, Geoch. in 1983
7	Corporation Falconbridge Copper	Evans Lake - DD-4 in 1981
8	Cumberland Resources L.	Armit Lake - A Mag and AEM in 1984; Evans Lake - A Mag and AEM in 1984; Grebe Lake - A Mag and AEM in 1984; Houghton Lake - A Mag and AEM in 1984
9	Dome Exploration (Canada) L.	Dona Lake - DD-66-32,318.08'; Skinner Lake - DD-23-6044.9' in 1978; Zeemel Lake - DD-27-13733' in 1985
10	Eden Roc Mineral Corp.	Caley Lake - GL and Mag in 1984
11	Eldorado Nuclear L.	Erichsen Lake - DD-3-975' in 1983
12	Falconbridge L. and Steep Rock Res. Inc.	Fourbay Lake - DD-1-626' in 1985; Squaw Lake - DD-9-4021.5' in 1984
13	First Generation Res. L.	Fourbay Lake - GL in 1983, Mag and EM in 1985
14	Golden Maverick Res. Corp.	Doghole Lake - A Mag and AEM in 1984; Little Ochig Lake - A Mag and AEM in 1984; Matapesatakun Lake - A Mag and AEM in 1984
15	Golden Range Res. Inc.	Parnes Lake - Mag and EM in 1984
16	Goldlund Mines L.	Echo Township - STr in 1983
17	Goldwin Res. L.	Zarn Lake - DD-3-715.5' in 1984
18	Grandad Res. L.	Beckington Lake - DD-1 in 1985
19	Hoyle R Inc. & Regis Development	Handcuff Lake - DD-6-1251' in 1985
20	Inco L.	Erichsen Lake - DD-1-471'in 1983
21	Jalna Res.	Sixmile Lake - Mag, EM, IP in 1984
22	Johnson, Stanley C.	McAree Township - Mechanical Work in 1983
23	Kuryliw, Chester	Fourbay Lake - GL, A in 1984
24	Mattagami Lake Mines L.	Penassi Lake - DD-1-764' in 1974
25	Moss Res.	Dona Lake - DD-47-14,946.6' in 1984
26	Musselwhite, Allan L.	Zeemel Lake - DD-13-2637.2' in 1975
27	Norminex L. and Winterbourne Expl.	Valora Lake - A Mag, AEM, VLF-EM in 1985
28	Northern Dynasty Expl. L.	Seeseep Lake - Manual Work in 1985
29	Petromet Res. L.	Beckington Lake - Mag, EM, GL, Geoch in 1984
30	Petrunka, David	Sharron Lake - STr, Tr in 1983; Manual Work in 1985
31	Pollock, John A.	Beckington Lake - DD-1-300' in 1984
32	Ram Petroleum L. and Ray Ramsay	Grebe Lake - GL in 1984
33	Redden, J. W.	Sixmile Lake - Mechanical Work in 1985
34	Regis Development Corp.	Penassi Lake - Mag, EM in 1984
35	Riverton Res. Corp.	Fourbay Lake - DD-5-1585' in 1985
36	Roberecki, E.	Squaw Lake - Tr in 1985
37	Rupert, Roy J.	Trist Lake - A in 1985
38	Sault Meadows Energy Corp.	Fourbay Lake - Mag in 1985
39	Scammell & Associates Mining and Expl.	Penassi Lake - Geophys in 1985
40	Selco Mining Corp. L.	Echo Township - DD-1-410' in 1976
41	Sherritt Gordon	Beckington, Geoch in 1984

TABLE 3.1 **Continued**

Number on Figure	Individual or Company	Activity
42	Steep Rock Res. L.	Squaw Lake - Mag, VLF-EM in 1984
43	Stornaway Res. L.	Squaw Lake - DD-3-817' in 1985
44	Sulpetro Minerals L.	Wesleyan Lake - Tr in 1984
45	Tarbush Lode Mining C. L.	Kabik Lake - DD-2-645', STr, GL in 1984
46	Teck Explorations L.	Evans Lake - Mag, STD in 1983/84; Conant Township - Tr, STr, Mag, CS, Geoch, Geophys, DD-12-4621.7' in 1984/85
47	Terraquest L.	Sixmile Lake - A Mag, VLF-EM in 1985
48	Thompson, Walter Martin	Valora Lake - DD-4-2250' in 1985
49	Umex Inc.	Beckington Lake - DD-12-8619.7', Geoch, CS, Geophys, GL in 1984/85; Evans Lake - Geoch, A. CS, DD-5-1534.8' in 1984/85; Ponsford Lake - DD-7-3319' in 1970

date has been the discovery and drilling of an area near the Musselwhite Consortium Deposit on Opapimiskan Lake. Good gold intersections were obtained on the northern shore of the lake in altered magnetic iron formation folded into north-plunging antiforms.

The Dunlop Grubstake, a group of young geologists from Vancouver, ran an exploration program in 1984 and 1985 which resulted in their acquiring a number of new prospects in the North Caribou and Meen-Dempster Lakes areas. These properties have been acquired by the Northern Dynasty Exploration Limited for further exploration.

The author is encouraged by the programs described above since, in many cases, the properties were acquired on the basis of good geological work and involved new prospects, rather than a reactivation of known properties.

Falconbridge Limited continued an exploratory program on the Armstrong-Best properties on King Bay of Sturgeon Lake. They have optioned other properties in the area and have a drilling and geological program in progress.

Camreco Incorporated and Tarbush Lode Mining Limited hold properties near Goldlund Mine in Echo Township. Tarbush Lode Mining Limited has run a drilling and exploratory program for the past two years on their properties. Most recently they evaluated the Eaglelund prospect north of Goldlund Mine.

TABLE 3.2 **SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT**

* Corrected figures of 1984 (additional work not shown is included in the Total Man Days)

** 1985 figures up to and including November (additional work not shown is included in Total Man Days)

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1974	1,011	3,223	5,659	38,049.0	6,255	102	44,406
1975	1,019	2,489	3,903	38,492.7	18,953	1,858	59,303.7
1976	1,185	1,120	3,958	27,111.0	11,555	185	38,851
1977	1,261	1,320	3,760	17,880.1	13,931	946	32,757.1
1978	2,018	765	5,094	33,371.3	57,501	600	91,472.3
1979	1,012	1,061	5,045	30,869	27,605.4	1,949	60,423.4
1980	3,485	1,391	7,068	42,633	13,524	10,800	66,957
1981	2,861	1,582	8,303	42,588	232,184	4,866	287,626
1982	842	1,766	7,737	35,329	73,486	13,980	167,289
1983	4,398	1,164	10,971	69,568.8	85,536.5	23,738	197,223.1
1984*	5,009	4,074	10,625	42,425	113,830	24,941.1	205,214.64
1985**	2,471	3,623	9,643	91,691.8	147,245.9	19,608.7	259,617.7

TABLE 3.3 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

Abbreviations for Tables Used in this Report

AEM - Airborne Electromagnetic Survey
A Mag - Airborne Magnetometer Survey
Assess - Assessment Work
BM - Base Metal
CS - Core Samples
DD - Diamond Drilling(numbers following "DD" indicate the number of holes drilled and total length drilled respectively)

DDH - Diamond Drill Holes
EM - Electromagnetic Survey
Geochem - Geochemical Survey
Geophys - Geophysical Survey
GL - Geological Survey
IP - Induced Polarization Survey
Mag - Magnetometer Survey
OMEP - Ontario Mineral Exploration Program

OVD - Overburden Drilling
SA - Sampling, Assays
STD - Soils Test Drilling
STr - Stripping, Soil Trenching
Tr - Trenching
VLF - Very Low Frequency

Mineral and Metal Symbols

Au-Gold
Ag-Silver
Cu-Copper

Pb-Lead
Zn-Zinc
cp-Chalcopyrite

mo-Molybdenite
po-pyrrhotite
py-pyrite
Mo-Molybdenum

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Akow Lake	53B/16SW	Cominco Limited	BM	Assess.	OVD	1982	2.4877	2
Beckington Lake	52J/02NE	Petromet Resources	Au	Assess.	GL, Geoch, Mag, EM	1984	2.6340	67
		Umex Incorporated	py,po,cp	Assess.	DD-1-322m	1984	--	68
		Petromet Resources	Au	Assess.	Mag, EM, GL, Geoch	1984	--	69
		Pollock, John A.	Pb,Mo,Ag,	Assess.	DD-1-300'	1984	--	72
		Sherritt Gorden	Au,Zn,Cu	Assess.	Geoch	1984	2.7579	70
		Umex Incorporated	py,po,cp	Assess.	DD-3-1284'	1984	2.7606	71
		Grandad Resources L.	--	Assess.	DD-1	1985	--	76
		Umex Incorporated	Au	Assess.	Geoch	1985	--	77
		Umex Incorporated	Au	Assess.	CS	1985	--	73
		Umex Incorporated	py,po	Assess.	Geophys, Geoch, GL	1984	--	74
		Umex Incorporated	--	Assess.	Geoch	1985	2.7814	75
		Umex Incorporated	--	Assess.	Geophys	1985	2.8271	78
		Umex Incorporated	--	Assess.	Geophys	1985	2.8177	79
		Umex Incorporated	--	Assess.	DD-4-1022.1m,SA	1985	2.8125	80
		Umex Incorporated	--	Assess.	DD-4-891.8m,CS	1985	--	81
Caley Lake	520/07SE	Eden Roc Mineral Corporation	Au	Assess.	GL, Mag	1984	2.7277	--
Conant Township	52J/07SE	Teck Exploration L.	py	Assess.	Tr	1984	--	101
		Teck Exploration L.	Au	Assess.	DD-2-522.5'	1984	--	102
		Teck Exploration L.	--	Assess.	STr	1985	--	104
		Teck Exploration L.	--	Assess.	Geoch	1984	2.7818	111
		Teck Exploration L.	Au	Assess.	DD-9-3825', CS	1984	--	116
		Teck Exploration L.	Au	Assess.	CS	1985	--	108
		Teck Exploration L.	Au	Assess.	DD-1-274.2'	1985	--	118
		Teck Exploration L.	--	Assess.	Geoch	1985	--	117
Doghole Lake	520/01NW	Golden Maverick Resources Corp.	BM,Au	Assess.	Mag, AEM	1984	2.7309	--
Dona Lake	520/08NE	Dome Exploration (Canada) Limited	--	Assess.	DD-38-20,161'	1985	--	36
		Dome Exploration (Canada) Limited	--	Assess.	DD-13-1585.9m	1985	--	37
		Dome Exploration (Canada) Limited	--	Assess.	DD-15-6954m	1985	--	35
		Moss Resources	--	Assess.	DD-47-14946.6'	1984	--	34
Duffell Lake	520/02NW	Noranda Expl. C. L.	--	Assess.	Mag, EM	1984	2.7016	--
		Amoco Canada Petroleum Limited	--	Assess.	DD-10-3392'	1984	--	12
Echo Township	52F/16NW	Goldlund-Mines L.	--	Assess.	STr	1984	--	69
		Selco Mining Corp. L.	--	Assess.	DD-1-410'	1976	--	68
Erichsen Lake	53B/15NE	Eldorado Nuclear L.	--	Assess.	DD-3-975'	1983	--	0010-A1
		Inco Limited	--	Assess.	DD-1-471'	1983	--	0010-C1

TABLE 3.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Erichsen Lake	53B/15NE	Eldorado Nuclear L.	-	Assess.	GL, Geoch, Geophys	1982	2.5047	0011
Evans Lake	52J/07SE	Umex Incorporated	py,Ag,Au	Assess.	Geoch	1984	2.7315	100
		Umex Incorporated	py	Assess.	DD-2-849'	1984	--	103
		Umex Incorporated	--	Assess.	Geoch	1984	2.7396	105
		Umex Incorporated	--	Assess.	Geoch, SA	1984	2.7603	106
		Umex Incorporated	--	Assess.	DD-1-130.1m	1985	--	110
		Donner, John	Cu,Pb,Zn, Ag	Assess.	DD-7-1966'	1984	--	107
		Corporation Falconbridge Copper	--	Assess.	DD-4	1981	--	113
		Umex Incorporated	--	Assess.	DD-2-259', SA	1984	--	112
		Umex Incorporated	--	Assess.	Geoch, SA, CS	1984	--	115
		Teck Exploration L.	--	Assess.	Mag, STD	1983/84	--	114
		Cumberland Resources	--	Assess.	A Mag, EM	1984	2.7299	--
Fourbay Lake	52J/02SW	Kuryliw, Chester	Au	Assess.	GL, SA	1984	2.7316	76
		First Generation Resources	Au,Ag,Cu, Zn,Pb	Assess.	GL	1983	2.7190	77
		Sault Meadows Energy Corporation	--	Assess.	Mag, EM	1985	2.7136	78
		Riverton Resources Corporation	Au	Assess.	DD-5-1585'	1985	--	79
		Falconbridge L. and Steep Rock Res. L.	--	Assess.	DD-1-626'	1985	--	80
		Wasabi Resources L.	Au	Assess.	EM	1984	2.8172	81
		First Generation Resources Limited	--	Assess.	Mag, EM	1985	2.8377	82
Grebe Lake and McCubbin Township	52J/07NE	Ram Petroleums L. and Ray Ramsay	--	Assess.	GL	1984	2.6300	53
Handcuff Lake	53J/03SE	Hoyle R Inc. and Regis Development	--	Assess.	DD-6-1251'	1985	--	16
Kabik Lake and Pickerel Township	52F/16NE	Tarbush Lode Mining Company Limited	--	Assess.	STr, GL	1984	--	40
		Tarbush Lode Mining Company Limited	--	Assess.	DD-2-645'	1985	--	41
Little Ochig Lake	520/08SW	Golden Maverick Resources Corp.	BM, Au	Assess.	A Mag, AEM	1984	2.7309	--
Makoop River	52G/10SW	Canadian Nickel C. L.	--	Assess.	DD(Drill Logs in Red Lake)	1972	--	1
McAree Township	52F/16SW	Johnson, Stanley, C.	--	Assess.	Mechanical	1983	--	37
McIlraith Township	52F/16NW	BP Resources	Au	Assess.	DD-1-404'	1984	--	67
Meawagank Lake	53A/5NW	Canadian Nickel C. L.	--	Assess.	DD-7-1668'	1982	--	21
Parnes Lake	52G/13NW	Golden Range Res. Incorporated	Au	Assess.	Mag, EM	1984	2.7214	--
Penassi Lake	52G/14NE	Regis Development Corporation	Au	Assess.	Mag, EM	1984	2.7319	71
		Mattagami Lake Mines Limited	--	Assess.	DD-1-764'	1974	--	72
		Scammel & Associates Mining and Expl.	--	Assess.	Mag, VLF-EM	1984/85	2.8080	73
Ponsford Lake	520/09SW	Umex Incorporated	--	Assess.	DD-7-3319'	1970	--	14
Seeseep Lake	53B/15NW	Northern Dynasty Exploration Limited	--	Assess.	Manual Work	1985	--	12
Sharron Lake	52J/04NE	Petrunka, David	--	Assess.	STr, Tr	1983	--	21
		Petrunka, David	--	Assess.	Mechanical Work	1985	--	22

TABLE 3.3 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Sixmile Lake	52G/15NW	Jalna Resources L.	Au	Assess.	Mag,VLF-EM, IP	1984	2.7154	122
		Terraquest Limited	Au	Assess.	A Mag, VLF-EM	1985	--	123
		Redden, J. W.	--	Assess.	Mechanical Work	1985	--	124
Skinner Lake	53B/09NW	Dome Exploration (Canada) Limited	--	Assess.	DD-23-6044.9'	1978	--	24
Squaw Lake	52J/02SE	Falconbridge L.	py,po	Assess.	DD-5-2175'	1985	--	64
		Steep Rock Res. L.	--	Assess.	Mag, VLF-EM	1984	2.5909	61
		Moran Resources	--	Assess.	DD-1-335.6'	1984	--	63
		Falconbridge L.	--	Assess.	DD-1-613.5'	1985	--	65
		Falconbridge L.	--	Assess.	DD-1-400'	1985	--	66
		Falconbridge L.	po,py	Assess.	DD-2-833'	1985	--	67
		Stornaway Resources	Au	Assess.	DD-2-817'	1985	--	68
		Copconda York	Au	Assess.	Humus, Geoch	1983	2.6532	--
		Roberecki, Ed	--	Assess.	Tr, STr, Mech	1985	--	69
Tarp Lake	52O/09SE	Best, Allan	py,po,cp	Assess.	DD-1-402'	1985	--	40
Trist Lake	52J/14NE	Rupert, Roy J.	--	Assess.	SA	1985	--	18
Valora Lake	52G/14SE	Thompson, W. M.	Cu,Zn,Au, Ag	Assess.	DD-4-2250'	1985	--	102
		Norminex & Winterbourne Exploration	Au	Assess.	VLF-EM A Mag, AEM,	1985	2.7270	103
Vermilion Township	52K/01SE	Kerr Addison	--	Assess.	Mag,EM,GL,Geoch	1983	2.5733	23
Wapamisk Creek	53B/02NE	Canadian Occidental Petroleums L.	--	Assess.	Tr	1982	--	15
Wesleyan L.	52O/04NE	Sulpetro Minerals L.	Au,Ag,Cu, Pb	Assess.	SA	1984	2.7317	21
		Sulpetro Minerals L.	--	Assess.	Tr	1984	--	22
Zarn Lake	52J/04SE	Goldwinn Resources	--	Assess.	DD-3-715.5'	1984	--	20
Zeemel Lake	53B/09SW	Best, Allan; Armstrong, G.; and Salidle, M.	--	Assess.	Manual, Mech	1985	--	28
		Musselwhite, Allan L.	Au	Assess.	DD-4-1050'	1975	--	26
		Musselwhite, Allan L.	py,po	Assess.	DD-9-1587.2'	1975	--	27
		Dome Exploration (Canada) Limited	Au	Assess.	DD-27-14,605'	1975	--	29

RECOMMENDATION FOR EXPLORATION

Since at least half the exploration effort in the Patricia Mining Division has been directed towards gold in magnetic iron formation, it hardly seems necessary to make the point of the value of this exploration target.

The Wabigoon Subprovince has not shown much promise for this type of gold deposit but the Uchi and Sachigo Subprovinces have a number of showings and prospects.

Wunnummin Lake has been visited and does not appear to be similar to North Caribou Lake. An appropriate exploration tool would appear to be lake sediment sampling for this little known belt.

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TABLE 3.4 ACTIVE OMEP PROGRAMS IN THE PATRICIA MINING DIVISION, ASSISTANCE COMMITTTED BUT NOT YET PAID OUT 11/12/85

Location	Eligible Expenditures($)	OMEP Assistance($)
Caley Lake	85 375.00	21 344.00
Connell Tp	259 484.00	64 871.00
Dona Lake	182 600.00	45 650.00
Drayton Tp	13 700.00	3 425.00
Echo Tp	107 078.00	26 770.00
Evans Lake	111 550.00	27 888.00
Firstloon Lake	438 200.00	145 800.00
Fourbay Lake	296 255.00	74 064.00
Fry Lake	85 750.00	21 438.00
Handcuff Lake	108 963.00	27 241.00
Kapkichi Lake	6 912.00	1 728.00
Keeyask Lake	459 350.00	114 838.00
Matapesatakun L.	100 000.00	25 000.00
McAree Tp	147 375.00	36 844.00
McCubbin Tp	28 665.00	7 166.00
Neawagank Lake	50 000.00	12 500.00
Poisson Tp	60 969.00	15 242.00
Sixmile Lake	294 782.00	73 696.00
Skinner Lake	1 230 387.00	307 597.00
Squaw Lake	264 063.00	66 016.00
Tarp Lake	226 845.00	56 711.00
Valora Lake	44 500.00	11 125.00
Wapamisk Creek	199 000.00	49 750.00
Zeemel Lake	41 479.00	10 370.00
Total	4 843 282.00	1 247 074.00

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4. Thunder Bay Resident Geologist Area, North Central Region

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[2]Economic Geologist, Ontario Ministry of Northern Development and Mines, Thunder Bay

INTRODUCTION

Current permanent staff in the Thunder Bay Office include: K.G. Fenwick, Regional Mineral Resources Co-ordinator; J.F. Scott, Resource Geologist; and A.R. Dowton, Secretary. The remainder of the staff held contract positions. F.J. Kristjansson, Quaternary Geologist, was responsible for geological input to land use concerns (such as Forest Management Agreements and Municipal Planning) and aggregate mapping. The Beardmore-Geraldton Economic Geologist Program was supervised by J.K. Mason, Resource Geologist, with assistance from G.D. White, Resource Geologist. B.R. Schnieders, Resource Geologist, with assistance from A.A. Speed and Mike Hine, Resource Geologists, ran the Economic Geologist Program in the Schreiber-Terrace Bay area. M.C. Kennedy, Resource Geologist, with assistance from P.M. Gertzbein, Resource Geologist, continued a Building Stone Inventory of the North Central Region. A.D. MacTavish and R.J.A. Dutka, Resource Geologists, ran a Cobalt-Base Metal-Platinum Group Elements Study in the Atikokan area. P. Perry and T. Twomey, Resource Geologists, prepared Geological Data Inventory Folios. S. Koski supervised the Assessment Files. J. Seguin, Senior Assistant, aided J.F. Scott in mapping MacGregor Township. R. Larson and M. Hine were contracted to give Junior Forest Ranger talks. D. Parker and C. Vranjkovic worked as Experience '85 students. Four Mining Sector Work Programs with a staff of 18 were run in 1985. G.D. White, Drill Core Library Geologist and P. Hinz, Assistant Core Library Geologist, have been hired to run the newly constructed Thunder Bay Drill Core Library.

ACKNOWLEDGMENTS

The section in this report on Quaternary Geology was written by F.J. Kristjansson. The description of the Schreiber-Terrace Bay Economic Geologist Program was written by B.R. Schnieders with assistance from A.A. Speed. J.K. Mason, with help from G.D. White, wrote the section on the Beardmore-Geraldton Economic Geologist Program. The report on the Cobalt-Base Metal-Platinum Group Elements Study in the Atikokan area was written by A.D. MacTavish and R.J.A. Dutka. M.C. Kennedy and P.M. Gertzbein contributed the section on Building Stone in the North Central Region. G.D. White and P. Hinz wrote the section dealing with the activities of the Core Library. Technical support was provided by S. Koski, P. Perry, and A.R. Dowton.

RESIDENT GEOLOGIST STAFF ACTIVITIES

Much of the Resident Geologist staff's time was spent in consultation with prospectors and with geologists from exploration and mining companies (an average of 12 consultations a day). Other activities included field trips, tours, and property visits.

The Hemlo area remained very active. The Resident Geologist gave a total of six talks on the Hemlo deposit to various groups and organizations and three field trips were given. In addition, approximately three weeks were spent in the area carrying out field research. A section of the 1985 Canadian Institute of Mining and Metallurgy-Geological Association of Canada Field Trip Guide to Hemlo was written. Approximately twenty 10-minute interviews on various topics in mining were given to CBC Radio Noon, aired in Northern Ontario. A number of silver properties in the Thunder Bay area were visited. A paper on "Amethyst in Ontario" was written and published in the Canadian Gemologist. A course on prospecting was given through Confederation College, Thunder Bay.

J.K. Mason gave seven tours in the Beardmore-Geraldton area. A Field Trip Guide of this area was published (Mason *et al.* 1985). B.R. Schnieders led five tours in the Schreiber-Terrace Bay area. Property visits and reports of the Atikokan Economic Geologist. Open File Report 5539 by B.R. Schnieders and R.J.A. Dutka, was published. Four poster displays were presented at the Ontario Geological Survey's Geoscience Research Seminar and Open House, 1985, Toronto.

K.G. Fenwick carried out field examinations of hazard land locations throughout the region, as well as compiling historical data on early mining in the area.

J.F. Scott, with assistance from J. Seguin, completed the mapping of MacGregor Township.

Geological staff, particularly F.J. Kristjansson, continued to be involved in land use planning, mining exploration in candidate parks, forest management agreements, environmental issues, and road placements. A number of townships were given assistance in assessing aggregate potential. Several public meetings concerning aggregate assessment were attended.

Four Mining Sector Work Programs, employing a total of 18 people, were organized and supervised through this office. These included locating hazard land sites, updating mineral deposit files, preparing overlays for the assessment files, and collecting core for the Drill Core Library.

MINING ACTIVITIES

METALLIC MINERALS

The two major base metal producers in the North Central Region are the Noranda Incorporated (GECO Division) copper-zinc-silver mine at Manitouwadge (7) and the Inco Limited nickel-copper mine at Shebandowan (4). The GECO Mine in 1984 milled 1 382 000 tons of ore to produce 23 030 tons of copper, 36 440 tons of zinc, 380 tons of lead, and 1 404 000 ounces of silver (Canadian Mines Handbook 1985-86). The Shebandowan Mine has been in continuous production for all of 1985.

The Teck Corporation custom mill (formerly the Pancontinental Mining (Canada) Limited custom mill) in Beardmore closed down in 1985.

The Northern Concentrators Limited's custom mill in Thunder Bay processed 272 tons of ore (B. Doucet, Mill Manager, Northern Concentrators, personal communication, 1985).

Three new gold mines started producing in the Hemlo area (*see* Hemlo Section, this report). Q.C. Explorations Limited has a porta-mill in Thunder Bay to process dredged dump material from the former Silver Islet Mine. Atlantic Mining Corporation set up a vortex mill on the old Sand River Mine property near Beardmore.

INDUSTRIAL MINERALS

Most of the amethyst production came from operations in MacTavish Township, northeast of Thunder Bay. These include the deposits of Gunnard Noyes (3), The Ontario Gem Company (9), J. Barrett Mine (1), The Dorion Amethyst Mine (2), and the Thunder Bay Amethyst Panorama (11).

Recently, Great Lakes Ceramics Incorporated acquired the closed brick plant of Thunderbrick Limited in Rosslyn Village. High alumina clay deposits from Saskatchewan will be used as the raw material for the plant. Twenty-three people will be employed and will initially produce 3 million square feet of ceramic tile a year (Lakehead Living, July 23, 1985, p.1). Tiles produced are slated for eastern Canadian and northeastern U.S. markets.

CLAIM STAKING AND EXPLORATION ACTIVITY

The total number of claims staked in the North Central Region in 1985 was less than the number of claims staked in 1984. The total number of active claims also decreased from the record high in 1984.

The amount of assessment work filed in 1985 was less than that filed in 1984.

SILVER VEINS IN THE THUNDER BAY AREA

INTRODUCTION

Much of the silver mining in the Thunder Bay area took place during a 50-year period, from 1840 to 1890, when the region was isolated and underdeveloped. Records of this mining activity are sketchy and poorly documented. As a result, K.G. Kenwick, Regional Mineral Resources Co-ordinator, initiated a Historical Research Program involving a literature search of available newspapers and journals published during this period. This research has turned up a number of undocumented silver occurrences and extensive data on known mines. A number of these mines were visited under a Section 38 Program (Hazard Lands Survey to locate abandoned mine workings) and by the Resident Geologist's staff during the field season to document the geology.

Recent industry activity is limited to Q.C. Explorations Limited's recovery operation of the dump material at Silver Islet and to E. Johnson's exploration of dumps in the Porcupine Mine area, southwest of Thunder Bay.

REGIONAL GEOLOGY

The rocks of the Thunder Bay area are Precambrian in age. The Archean rocks consist of folded mafic metavolcanics and metasediments intruded by quartz-monzonites which all belong to the Shebandowan "Greenstone Belt". Unconformably deposited on the Archean basement are a series of nearly flat-lying sedimentary rocks of the Gunflint Formation (2000 Ma; Floran and Papike 1975), Rove Formation (1850 Ma; Goldich 1972) and Sibley Group rocks (1300 Ma; Wanless and Loveridge 1976). These rocks have all been intruded by Logan diabase sills. Osler Group sedimentary and volcanic rocks are unconformably deposited on the above Proterozoic rocks. The Osler Group is intruded by Duluth-type gabbros and quartz-feldspar porphyry bodies.

Franklin (1981) divided the silver veins into two main groups: 1) an inland set associated with Logan-age sills, and 2) an island set associated with a Duluth-type gabbro dike. It appears that the Island Group of veins may change into Dorion lead-zinc veins and amethyst veins farther to the east. The general form, mineralogy, and associations of the Mainland and Island Groups are similar.

RECENT RESEARCH

Franklin (1970) carried out a metallogenetic study of the Proterozoic rocks of the Thunder Bay District. Since then, S. Kissin has supervised a number of silver-related B.Sc. theses at Lakehead University: Mosley (1977), Maunula (1979), Smyk (1984), and Harvey (1985). B. Jennings is currently working toward an M.Sc. thesis at Lakehead University studying fluid inclusions in the silver veins of the area.

HISTORY OF SILVER MINING IN THE THUNDER BAY AREA

The following is summarized from Henderson (1981), Mohide (1985), Strickland (1979), French (1976), and the Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay. Reconnaissance mapping by Logan of the Geological Survey of Canada in 1940, identified a number of mineral occurrences. The first recorded production of copper and silver in the region was from the Prince Location, 15 km southwest of Thunder Bay, in 1846, by the Montreal Mining Company. Most exploration during this period was directed at copper and lead, since gold and silver remained the property of the Crown under mining laws of the period. During 1846 and 1847, the Montreal Mining Company obtained 18 tracks of land, each containing 6000 acres, along the north shore of Lake Superior. In 1864, the mining law was changed allowing silver production but imposing a 10% royalty. In the same year, Peter McKellar

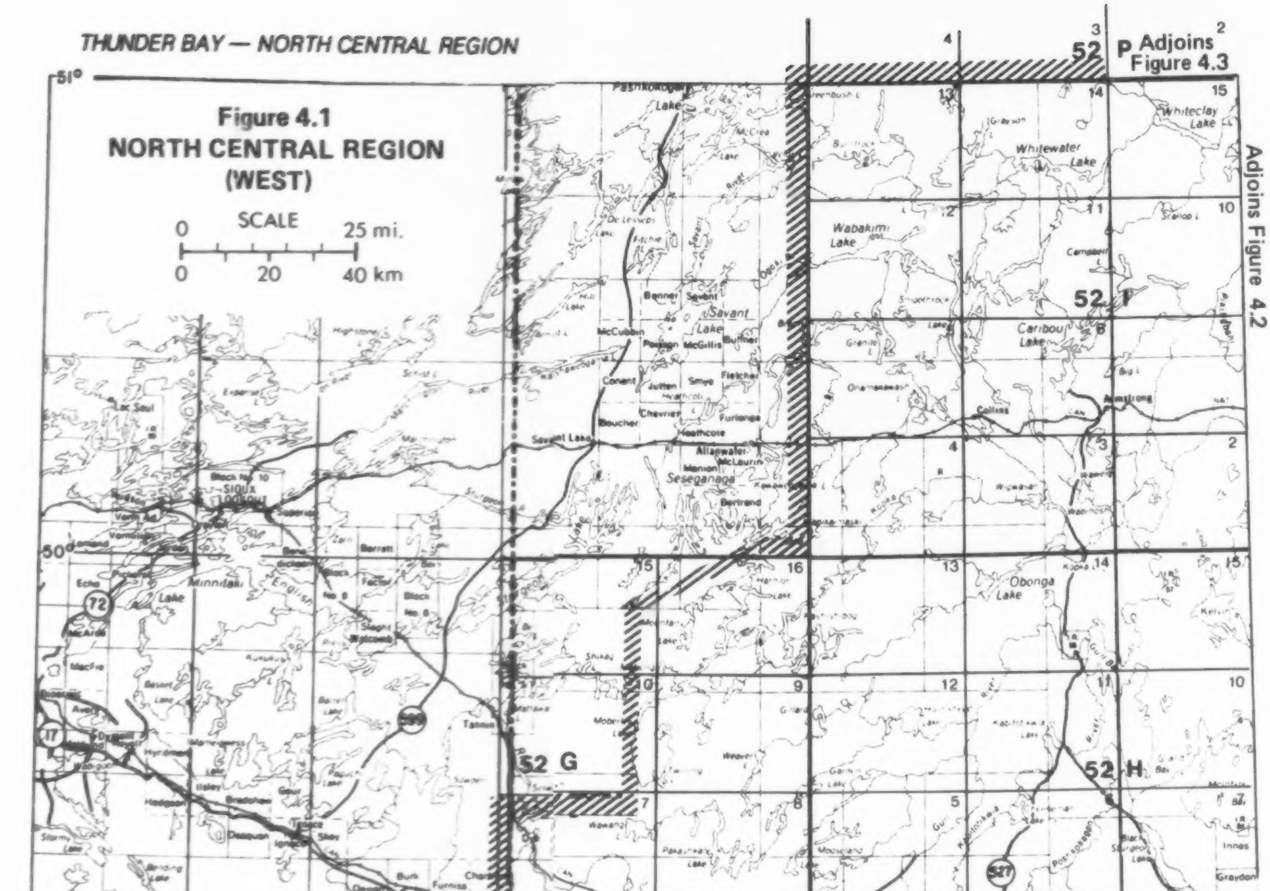

52 P Adjoins Figure 4.3
Adjoins Figure 4.2
SCALE
0 25 mi.
0 20 40 km
51°
50°
49°
48°
92°
91°
90°
89°
52 I
52 G
52 H
52 F
52 C
52 B
52 A
KENORA
RAINY RIVER
SIOUX LOOKOUT
Savant Lake
Seseganaga
Wabakimi Lake
Whitewater Lake
Whiteclay Lake
Caribou Lake
Obonga Lake
Minnitaki Lake
White Otter L
Lac des Mille Lacs
Dog Lake
Quetico Lake
Pickerel Lake
Agnes Lake
Arrow L
Mountain Lake
Pigeon River
Shebandowan
FORT ARTHUR
FORT WILLIAM
Thunder Bay
Thompson Island
Sibley
Silver Islet
Thunder Cape
72
17
599
11
527
11-17
587
102
588
61
593
1, 3
2
4
9
11

Figure 4.1
NORTH CENTRAL REGION (WEST)

EXPLANATION

● **Producing Mines**

1. Jim Barrett Mine . . . . Amethyst
2. Dorion Amethyst Mine . . . . Amethyst
3. Gunnard Noyes - Diamond . . . . Amethyst
4. Inco Metals Limited
   Shebandowan Mine . . . . Cu, Ni, PGM, Co
5. Lac Minerals Limited (Williams Property). . . . . . Au
6. Noranda Mines Limited (Hemlo Division). . . . . . Au
7. Noranda Mines Limited (Geco Division) . Cu, Zn, Ag
8. Northern Concentrators
   (Crooked Green Creek Mine) . . . . Au, Cu
9. Ontario Gem Company . . . . Amethyst
10. Teck Corporation (Hemlo Division) . . . . Au
11. Thunder Bay Amethyst Panorama . . . . . Amethyst

◑ **Mines and/or Properties under Development**

1. Corporation Falconbridge Copper
   Winston Mine. . . . . Zn, Cu, Ag, Au

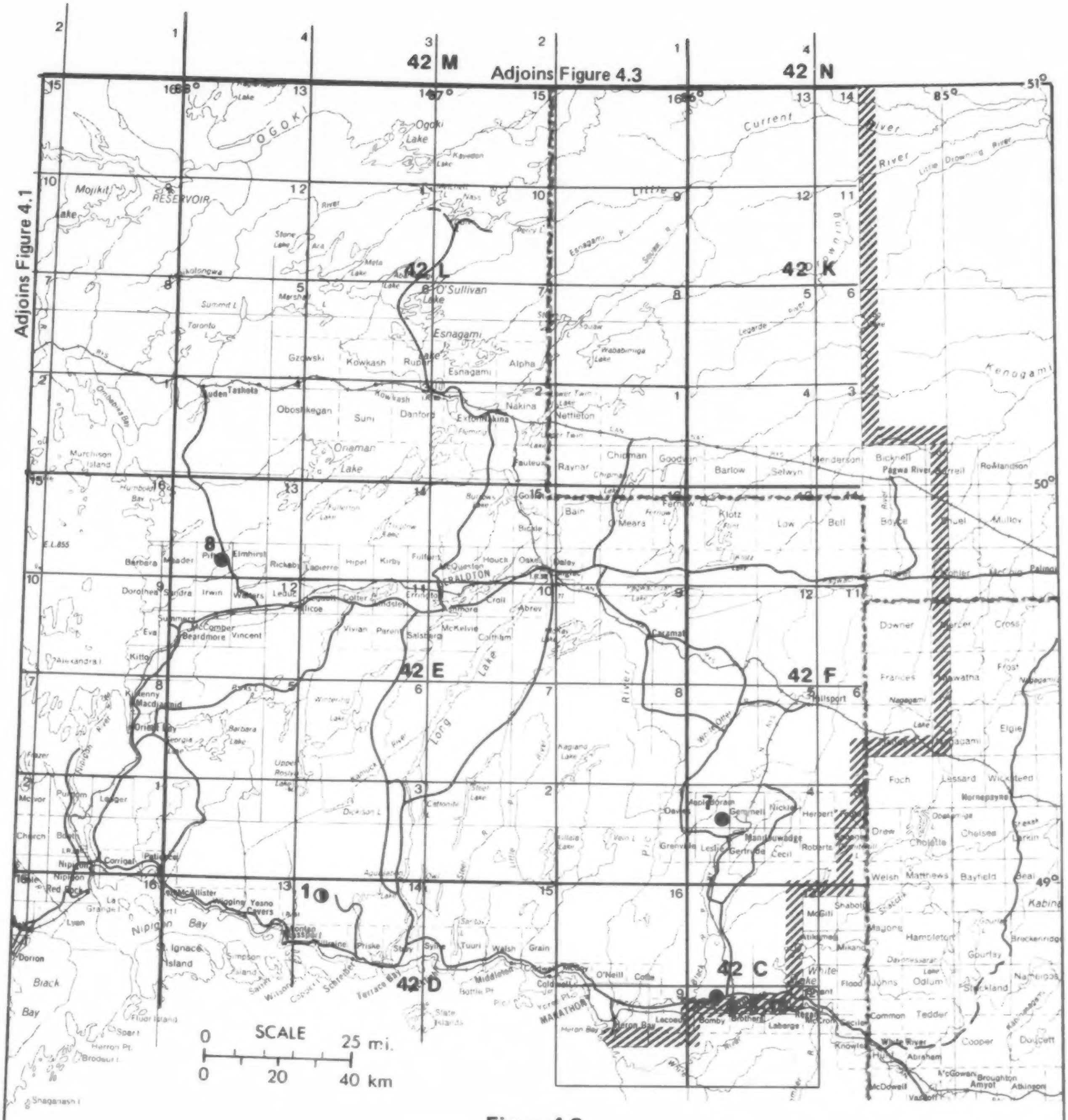

42 M
Adjoins Figure 4.3
42 N
Adjoins Figure 4.1
42 L
42 K
42 E
42 F
42 D
42 C
SCALE
0
25 mi.
0
20
40 km
OGOKI RESERVOIR
Ogoki Lake
O'Sullivan Lake
Esnagami Lake
Nakina
GERALDTON
Beardmore
Nipigon
Nipigon Bay
Dorion
Black Bay
Terrace Bay
MARATHON
Heron Bay
White River
Long Lake
Kenogami
Pagwa River
Manitouwadge
8
1
51°
50°
49°
85°

Figure 4.2
NORTH CENTRAL REGION
(EAST)

EXPLANATION

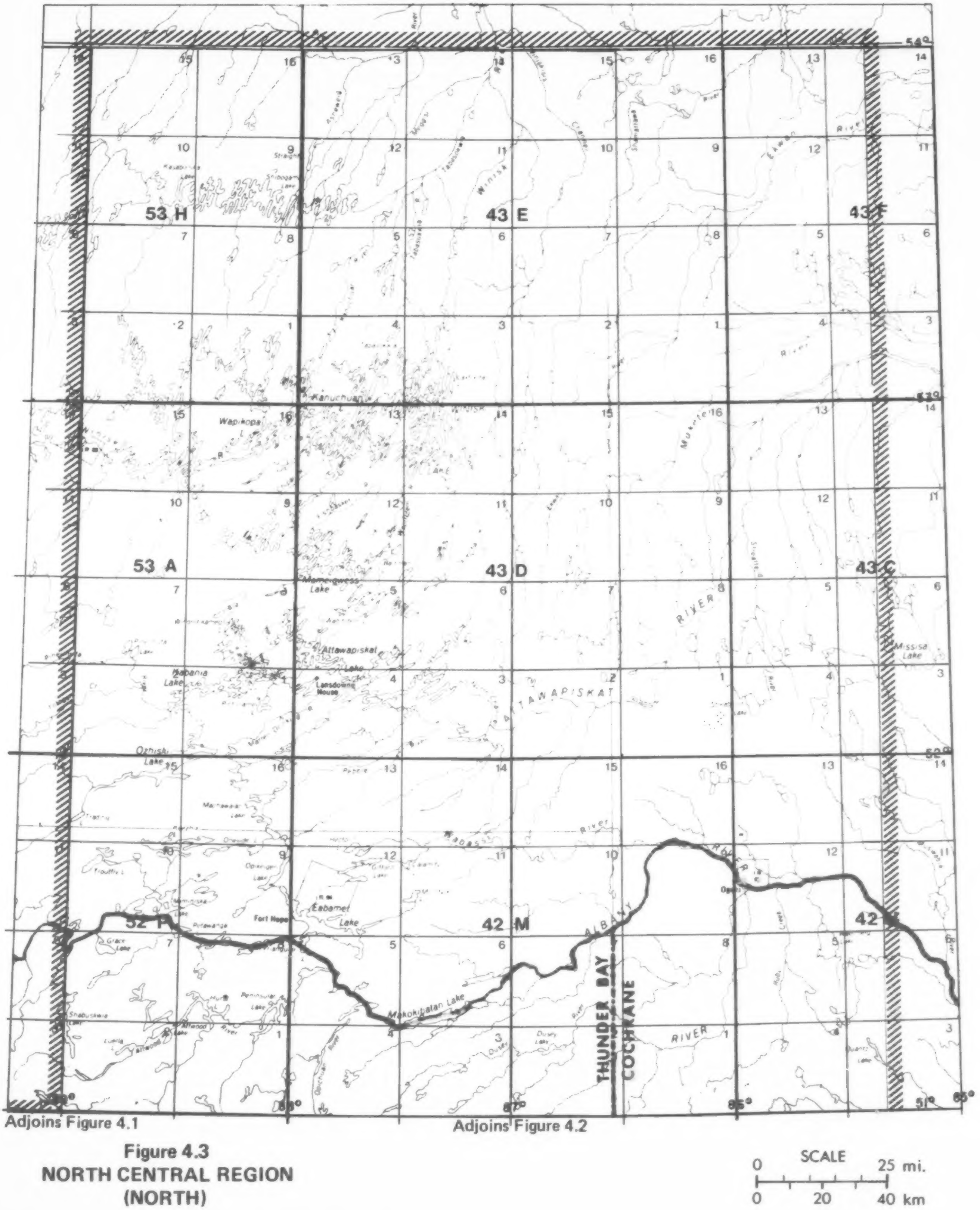
● Producing Mines

1. Jim Barrett Mine . . . . Amethyst
2. Dorion Amethyst Mine . . . . Amethyst
3. Gunnard Noyes - Diamond . . . . Amethyst
4. Inco Metals Limited
   Shebandowan Mine . . . . Cu, Ni, PGM, Co
5. Lac Minerals Limited (Williams Property). . . . . . Au
6. Noranda Mines Limited (Hemlo Division). . . . . . Au
7. Noranda Mines Limited (Geco Division) . Cu, Zn, Ag
8. Northern Concentrators
   (Crooked Green Creek Mine) . . . . Au, Cu
9. Ontario Gem Company . . . . Amethyst
10. Teck Corporation (Hemlo Division) . . . . Au
11. Thunder Bay Amethyst Panorama . . . . . Amethyst

◑ Mines and/or Properties under Development

1. Corporation Falconbridge Copper
   Winston Mine. . . . . Zn, Cu, Ag, Au

Boundary of North Central Region ▨


53 H
43 E
43 F
53 A
43 D
43 C
52 P
42 M
42
Kanuchuan L.
Wapikopa L.
Mameigwess Lake
Attawapiskat Lake
Lansdowne House
Habania Lake
ATTAWAPISKAT
RIVER
Missisa Lake
Ozhiski Lake
Opikeigen Lake
Fort Hope
Eabamet Lake
Mokokibatan Lake
ALBANY
RIVER
Ogoki
THUNDER BAY
COCHRANE
54°
53°
52°
51°
89°
88°
87°
86°
85°

Adjoins Figure 4.1

Adjoins Figure 4.2

Figure 4.3
NORTH CENTRAL REGION
(NORTH)

SCALE
0 25 mi.
0 20 40 km

TABLE 4.1 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

A-Airborne Survey
AEM-Airborne Electromagnetic Survey
A Mag-Airborne Magnetometer Survey
Assess-Assessment Work
Non Assess-Non Assessment Work Data
BTS-Basil Till Survey
CS-Core Samples
DD-Diamond Drilling (where shown the numbers following "DD" indicate the number of holes drilled and the total length drilled respectively)
EM-Electromagnetic Survey
Geochem-Geochemical Survey

GL-Geological Survey
Gr-Gravity Survey
Grad-Gradiometric Survey
HLEM-Horizontal Loop Electromagnetic Survey
IP-Induced Polarization Survey
Mag-Magnetometer Survey
Man Work-Manual Work
Mech Work-Mechanical Work
OMEP-Ontario Mineral Exploration Program
OVD-Overburden Drilling (the numbers following "OVD" indicate the number of holes drilled respectively)
PR-Property Report
Photo-Photogeological Report

(r)-Rock
Rad-Radiometric Survey
Res-Resistivity Survey
(S)-Soil
SA-Sampling, Assays
SP-Self Potential Survey
STr-Stripping
Tr-Trenching
VLF-Very Low Frequency

Ag-Silver
Amy-Amythyst
Au-Gold

Bm-Base Metal
Cu-Copper
Li-Lithium
Marl-Marl
Ni-Nickel
Pd-Palladium
Pt-Platinum
Sb-Antimony
Ta-Tantalum
Zn-Zinc
ba-Barite
fl-Flourite
fel-Feldspar

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Strey Twp. (G-633)	42D14/SE	1. Acheron Resources Ltd. (Gracey, K. A.)	Au	Assess	VLF, Mag	1984	2.7752	
Black River Area (G-580), Wabikoba Lake Area (G-620)	42C13/NW/SW	2. Adnaron Minerals Ltd. (Mieklejohn, W.)	Au	Assess	VLF, Mag	1983	2.5916	
Metcalfe Lake Area (G-84)	42L4/NE	3a. Amax Minerals Ltd. (Tashota Group North Property)	Au	OMEP	GL, IP, VLF, Mag	1982	63.4120	
Metcalfe Lake Area (G-84), Oboshkegan Twp. (G-173), Gzwoski Twp. (G-182), Willet Lake Area (G-156)	42L4/NE, 42L5/SE	3b. Amax Minerals Ltd. (Tashota Group)	Au	OMEP	DD 11-3075 m	1982	63.4120	
Olga Lake Area (G-604), Black River Area (G-580)	42C13/NE/NW	4. Amendalagine, M. (Raleigh Energy Corp.) (Young, Seamus)	Au	Assess	AEM, VLF, A Mag	1983	2.[illegible]137	
Molson Lake Area/ Bomby Twp. (G-3173), Brothers Twp. (G-3172)	42C12/NW	5a. Americ Mines Ltd.	Au	Assess	VLF, Mag	19[illegible]	2.6736	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	5b. Americ Mines Ltd.	Au	Assess	SP	1984	2.8004	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	5c. Americ Mines Ltd.	Au	Assess	DD 1-60.96 m	1985	-	
Nesting Lake Area (G-342)	52P10/NE	6a. Anaconda Canada Explorations Ltd. (Szetu, S.) (Baynes, A. S.) (Keezhik Creek Project)	Au	Assess	Mag, VLF, GL, SA, Tr	1984	-	
Nesting Lake Area (G-342)	52P10/NE	6b. Anaconda Canada Explorations Ltd. (Szetu, S.)	Au	Assess	DD 4-212.5 m	1985	-	
Pic Twp. (G-630)	42D9/NE	7. Argo Explor. Ltd. (Pezim, M.)	Au	Assess	VLF	1985	2.8170	
Barbara Lake Area (G-6), Pijitawabik Bay (G-111)	42E5/SW, 52H8/NE	8. Armeno Resources Inc. (Noranda-McVitte Property) (Newkirk-Vegan Property)	Li	Assess	GL, VLF, Mag	1984	2.7415	
Klotz Lake Area (G-295)	42F13/SW	9a. Atkinson, Brian	Au	Assess	Mag	1983	2.6528	
Klotz Lake Area (G-295)	42F13/SW	9b. Atkinson, Brian	Au	Non-Assess	Mag - No map	1983	2.6916	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lower Aguasabon Lake Area (G-599)	42D14/NE	10a. Barracuda Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1983	2.7082	
Lower Aguasabon Lake Area (G-599)	42D14/NE	10b. Barracuda Resources Ltd.	Au	Assess	SA, Geochem (S), (r), GL	1984	2.7962	
McTavish Twp. (G-675)	52A10/NE	11. Barrett, Jim	Amy	Assess	Man Work, Mech Work, STr	1984	-	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	12. Battle Energy Corp. (Laforest, Denis)(Rochon, Dan)	Au	Assess	VLF	1985	2.8597	
Molson Lake Area/ Rous Lake Area (G-611)	42C12/NW, 42D9/NE	13a. Bel Air Resources Ltd. (Westfield Minerals Ltd.) (Belont Resources Inc.)	Au	Assess	IP, Geochem, SA, GL, Mag	1983	2.6526	
Syine Twp. (G-634), Lower Aguasabon Lake Area (G-599), Strey Twp. (G-633)	42D14/SE/ NE/SE	13b. Bel Air Resources Ltd. (Gracey, K. A.)	Au	Assess	Geochem (S), SA, GL	1984	2.7081	
Priske Twp. (G-631), Lower Aguasabon Lake Area (G-599)	42D14/SE/ NE	14a. Bellevue Oil & Minerals (Noranda Explor. Co. Ltd.)	Au, Bm	Assess	AEM, A Mag	1983	2.6782	
Priske Twp. (G-631), Lower Agusabon Lake Area (G-599)	42D14/SE/ NE	14b. Bellevue Oil & Minerals Ltd. (Noranda Explor. Co. Ltd.)	Au, Bm	Assess	VLF, Mag	1984	2.7269	
Priske Twp. (G-631), Lower Aguasabon Lake Area (G-599)	42D14/SE/ NE	14c. Bellevue Oil & Minerals Ltd. (Noranda Explor. Co. Ltd.)	Au, Bm	Assess	GL	1984	2.7244	
Paipoonge Twp. (G-680)	52A6/SW	15. Belluz, B.	Ag	Assess	CS, DD 3-100.34 m	1984	-	
Norway Lake Area (G-545)	52G3/SW	16. Billiton Canada Ltd. (Red Paint Lake Property)	Au	Assess	BTS, Geochem, GL	1984	2.7311	
Bartman Lake Area (G-202)	43D12/SE	17. Blue Falcon Mines Ltd. (Cons. Silver Butte Property)	Au	Assess	VLF, Mag	1985	2.8131	
Seeley Lake Area (G-613)	42D16/SW	18. Boram Oil Ltd. (Mineta Resources Ltd.) (Filo, K.) (Roy, R.)	Au	Assess	IP, PR	1984	2.6694	
Caribou River Area (G-20), Linklater Lake Area (G-69)	52I11/SE, 52I10/SW	19a. BP Resources Canada Ltd.	Au	Assess	VLF, Mag	1985	2.7870	
Caribou River Area (G-20), Linklater Lake Area (G-69)	52I11/SE, 52I10/SW	19b. BP Resources Canada Ltd. (Selco Inc.)	Au	Assess	Geochem (S), SA	1985	2.8291	
Miminiska Lake Area (G-332)	52P10/SE	19c. BP Resources Canada Ltd. (Selco Inc.)	Au	Assess	DD 1-129.53 m	1984	-	
Miminiska Lake Area (G-332)	52P10/SE	19d. BP Resources Canada Ltd.	Au	Assess	HLEM, Mag	1984	2.8003	
Seeley Lake Area (G-613)	42D16/SW	20. Bremner, D. (Pic River Project)	Au	Assess	VLF, Mag	1985	2.8275	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	21. Bridge Resources Ltd.	Au	Assess	SA, Geochem (S), GL	1983	2.6943	
Ashmore Twp. (G-472)	42E10/NW	22. Bridgewest Develop. Corp.	Au	Assess	SA	1984	2.6898	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lower Aguasabon Lake Area (G-599)	42D14/NE	23. Bullet Energy Ltd.	Au	Assess	Geochem (S), SA, GL	1983	2.7078	
Garden Lake Area (G-721)	52H12/SW	24a. Bumbu, Costy	Au	Assess	Mech Work	1984	-	
Garden Lake Area (G-721)	52H12/SW	24b. Bumbu, Costy	Au	Assess	Mech Work	1985	-	
Garden Lake Area (G-721)	52H12/SW	24c. Bumbu, Costy	Au	Assess	Mech Work	1985	-	
Klotz Lake Area (G-295)	42F13/SW	25. Cache Explor. (Atkinson, David J.)	Au	Assess	Geochem (S), (r), GL	1985	2.8157	
Metcalfe Lake Area (G-84)	42L4/NE	26a. Callisto Minerals Inc. (519899 Ontario Ltd.) (Yzerdraat, W.)	Au	Assess	SA	1983	2.8410	
Metcalfe Lake Area (G-84)	42L4/NE	26b. Callisto Minerals Inc.	Au	Assess	Man Work, Mech Work	1984	-	
Metcalfe Lake Area (G-84)	42L4/NE	26c. Callisto Minerals Inc.	Au	Assess	Man Work, Mech Work	1984	-	
Metcalfe Lake Area (G-84)	42L4/NE	26d. Callisto Minerals Inc.	Au	Assess	SA	1984	2.7839	
Metcalfe Lake Area (G-84)	42L4/NE	26e. Callisto Minerals Inc.	Au	Assess	GL	1984	2.8018	
Metcalfe Lake Area (G-84)	42L4/NE	26f. Callisto Minerals Inc. (Yzerdraat, W.)	Au	Assess	SA	1985	2.8182	
Metcalfe Lake Area (G-84)	42L4/NE	26g. Callisto Minerals Inc. (519899 Ontario Ltd.) (Yzerdraat, W.)	Au	Assess	SA	1985	2.8549	
Metcalfe Lake Area (G-84)	42L4/NE	26h. Callisto Minerals Inc.	Au	Assess	Mag	1985	2.8591	
Hipel Twp./ Lapierre Lake Area (G-65)	42E14/SW	27. G. Calvery & Sons Ltd.	Au	Assess	VLF, Mag	1984	2.7332	
Alfred Lake/ McQueston Twp. (G-189)	42E15/SW	28. Camel Oil & Gas Ltd.	Au	Assess	Tr, GL, VLF, Mag	1985	2.8197	
Pic Twp. (G-630)	42D9/NE	29. Cameron, Kirk (Noranda Explor. Co. Ltd.) (Nexus Resources Corp.)	Au	Assess	DD 5-1285.5 m	1984	-	
Manitouwadge Lake Area (G-600), Barehead Lake Area (G-578)	42F4/NE/ SE	30a. 139250 Canada Inc.	Cu, Zn, Ag	Assess	AEM, VLF, A Mag	1985	2.8262	
Pagwachuan Lake Area (G-368), Laponen Lake Area (G-300)	42E9/NE/ NW	30b. 139250 Canada Inc.	Au	Assess	AEM, VLF, A Mag	1985	2.8242	
Castlebar Lake Area (G-220)	42E16/SE	31a. Canadian Nickel Co. Ltd.	Au	Assess	SA	1983	2.8175	
Castlebar Lake Area (G-220)	42E16/SE	31b. Canadian Nickel Co. Ltd.	Au	Assess	DD 1-117.78 m	1983	-	
Conacher Twp. (G-646)	52B9/SE	31c. Canadian Nickel Co. Ltd.	Ni, Cu	Assess	DD 4-422.29 m	1983	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Moss Twp. (G-676), Burchell Lake Area (G-706)	52B10/SE	31d. Canadian Nickel Co. Ltd. (Burchell Lake Project)	Au, Cu	Assess	GL	1983	2.7983	
Moss Twp. (G-676)	52B10/SE	31e. Canadian Nickel Co. Ltd.	Au, Cu	Assess	DD 2-182.88 m	1984	-	
Pyramid Lake Area (G-550)	52G2/SW	31f. Canadian Nickel Co. Ltd.	Au	Assess	DD 2-205.82 m	1983		
Pyramid Lake Area (G-550)	52G2/SW	31g. Canadian Nickel Co. Ltd.	Au	Assess	GL	1983	2.7477	
Ramsay-Wright Twp. (G-573)	52B14/NW	31h. Canadian Nickel Co. Ltd.	Au	Assess	DD 2-124.05 m	1983	-	
Ramsay-Wright Twp. (G-573)	52B14/NW	31i. Canadian Nickel Co. Ltd.	Au, Ag (Cu, Zn, Ni)	Assess	DD 2-148.43 m	1983	-	
Walters Twp. (G-171)	42E12/NE	32. Canady, Buford	Au	Assess	STr	1984	-	
Walters Twp. (G-171)	42E12/NE	33. Canady, Ed	Au	Assess	STr	1985	-	
Irwin Twp. (G-164)	42E12/NW	34a. Canamax Resources Inc.	Au	Assess	Mech Work	1984	-	
Irwin Twp. (G-164)	42E12/NW	34b. Canamax Resources Inc. (Theriault Option)	Au	Assess	DD 1-75 m	1985	-	
Irwin Twp. (G-164)	42E12/NW	34c. Canamax Resources Inc. (Theriault (Option)	Au	Assess	DD 9-798 m, SA	1985	-	
Irwin Twp. (G-164), Walters Twp. (G-171)	42E12/NW	34d. Canamax Resources Inc. (Theriault Option)	Au	Assess	VLF, Mag	1984	2.7913	
Max Lake Area (G-741)	52H3/NW	34e. Canamax Resources Inc. (Max Lake Project)	Au	Assess	GL	1984	2.8130	
Max Lake Area (G-741)	52H3/NW	34f. Canamax Resources Inc.	Au	Assess	DD 18-787.93 m	1984	-	
Wabikoba Lake Area (G-620)	42C13/SW	34g. Canamax Resources Inc. (Marge Enterprises) (June Resources)	Au	Assess	GL	1983	2.7158	
Rous Lake Area (G-611), Lorna Lake Area (G-598), Wabikoba Lake Area (G-620)	42D9/NE, 42D16/SE, 42C13/SW	35. Captain Cons. Resources/Koala Resources (Homestake Mineral Develop. Co.)	Au	Assess	SA, GL	1984	2.7401	
Molson Lake Area (G-603)	42C12/NW	36a. Caravelle Resources Ltd. (Gracey, K. A.)	Au	Assess	SA, Geochem (S), GL	1983	2.6944	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	36b. Caravelle Resources Ltd. (Captain Cons. Resources Ltd.) (Gracey, K. A.)	Au	Assess	DD 2-175.41 m	1983	-	
Seeley Lake Area (G-613)	42D16/SW	37a. Carlson Mines Ltd. (Carlson-Laurasia Property)	Au	Assess	IP	1984	2.7044	
Seeley Lake Area (G-613)	42D16/SW	37b. Carlson Mines Ltd. (Carlson-Laurasia Property)	Au	Assess	DD 1-190 m	1985	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
White Lake (North) Area (G-622)	42C13/SE	38. Carrera Resources Ltd. (Woynarski, John)	Au	Assess	SA	1983	2.8392	
White Lake (North) Area (G-622), Olga Lake Area (G-604)	42C13/SE/NE	39a. Cassex Resources Ltd. (Theresa Lake Property)	Au	Assess	EM, Mag	1984	2.6768	
White Lake (North) Area (G-622), Wabikoba Lake Area (G-620)	42C13/SE/SW	39b. Cassex Resources Ltd.	Au	Assess	GL, VLF	1984	2.7697	
McTavish Twp. (G-675)	52A10/NE	40a. Castagne, Alphonse A.	Amy	Assess	STr	1984	-	
McTavish Twp. (G-675)	52A10/NE	40b. Castagne, Alphonse A.	Amy	Assess	Mech Work	1984	-	
McTavish Twp. (G-675)	52A10/NE	40c. Castagne, Alphonse, A.	Amy	Assess	Man Work, Mech Work	1985	-	
Priske Twp. (G-631), Lower Aguasabon Lake Area (G-599)	42D14/NE	41a. Chapel Bay Explor. Inc. (Cunningham, Mike)	Au, Bm	Assess	SA, GL, VLF, Mag	1983	2.6531	
Priske Twp. (G-631)	42D14/NE	41b. Chapel Bay Explor. Inc.	Au, Bm	Assess	VLF, Mag	1984	2.7120	
Freeborn Twp. (G-570)	52B13/SE	42a. Chapman, S. F.	Au	Assess	AEM, VLF, A Mag	1985	2.7955	
Hutchinson Twp. (G-571), Sabawi Lake Area/McCaul Twp. (G-554)	52B14/SW	42b. Chapman, S. F.	Au	Assess	AEM, VLF, A Mag	1985	2.7892	
Lower Aguasabon Lake Area (G-599)	42D14/NE	43. Charger Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1984	2.7074	
Wabikoba Lake Area (G-620)	42C13/SW	44. Chavin of Canada Ltd. (Houston, C.) (Bumbu, M.)	Au	Assess	Geochem (S), SA, GL, EM, Mag	1983	2.7633	
Legault Twp. (G-170)	42E11/NW	45. Checkley, F. A.	Au	Assess	STr	1984	-	
Pic Twp. (G-630)	42D9/NE	46a. Chimera Resources Ltd. (Thompson, D.)	Au	Assess	IP, Res	1984	2.7859	
Pic Twp. (G-630)	42D9/NE	46b. Chimera Resources Ltd. (Thompson, D.)	Au	Assess	Geochem (S), GL, SA	1985	2.8428	
Factor Lake Area (G-527)	52C9/NE	47. Claymore Resources Ltd. (Mayflower Property) (Rich, Anthony)	Au	Assess	GL, VLF, Mag	1984	2.7561	
Black River Area (G-580), Olga Lake Area (G-604)	42C13/NW/NE	48a. Clear Mines Ltd.	Au	Assess	GL, VLF, Mag, Geochem (S)	1984	2.7387	
Olga Lake Area (G-604), Black River Area (G-580)	42C13/NE/NW	48b. Clear Mines Ltd. (Amendalagine, M.)	Au	Assess	AEM, VLF, A Mag	1983	2.8513	
Molson Lake Area/Brothers Twp. (G-3172), Bomby Twp. (G-3173)	42C12/NW	49a. Cons. Montclerg Mines Ltd.	Au	Assess	GL	1983	2.7493	
Molson Lake Area/Wabikoba Lake Area (G-620), Brothers Twp. (G-3172)	42C12/NW	49b. Cons. Montclerg Mines Ltd.	Au	Assess	GL	1983	2.7492	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Molson Lake Area/ Brothers Twp. (G-3172), Bomby Twp. (G-3173)	42C12/NW	49c. Cons. Montclerg Mines Ltd.	Au	Assess	Geochem (S), SA	1984	2.7499	
Wabikoba Lake Area (G-620)	42C13/SW	50. Core Energy Corp. (Mid Canada Explor. Services Ltd.)	Au	Assess	IP, GL	1984	2.7223	
Tuuri Twp. (G-635)	42D15/SW	51. Coronet Resources Ltd.	Au, Bm	Assess	Geochem (S), (r), SA, GL	1985	2.8051	
Blackwell Twp. (G-644), Laurie Twp. (G-669), Horne Twp. (G-664)	52A12/SW	52. Corporate Oil & Gas Ltd. (Huston, D. C.) (Weenusk, A.) (Colon, G.) (Munroe, R.) (Munroe, J.)	Au	Non-Assess	GL, Geochem, SA (No Maps)	1984	2.6681	
Pays Plat Lake Area (G-606), Rope Lake Area (G-609), Upper Aguasabon Lake Area (G-617), Lower Aguasabon Lake Area (G-599)	42D14/NW, 42E3/SW/ SE, 42D 14/NE	53a. Corp. Falconbridge Copper	Au, Bm	Assess	Geochem (r)	1983	2.6769	
Pays Plat Lake Area (G-606), Rope Lake Area (G-609)	42D14/NW, 42E3/SW	53b. Corp. Falconbridge Copper	Bm, Au	Assess	STr	1984	-	
Pays Plat Lake Area (G-606)	42D14/NW	53c. Corp. Falconbridge Copper	Bm	Assess	DD 16-9594.3 m	1985	-	
Rope Lake Area (G-609), Pays Plat Lake Area (G-606), Upper Aguasabon Lake Area (G-617), Lower Aguasabon Lake Area (G-599)	42E3/SW, 42D14/NW, 42E3/SE, 42D14/NE	53d. Corp. Falconbridge Copper	Au, Bm	Assess	GL	1984	2.7632	
Rope Lake Area (G-609), Upper Aguasabon Lake Area (G-617)	42E3/SW/ SE	53e. Corp. Falconbridge Copper	Au, Bm	Assess	Geochem (r)	1984	2.7631	
Rope Lake Area (G-609), Upper Aguasabon Lake Area (G-617)	42E3/SW/ SE	53f. Corp. Falconbridge Copper	Au, Bm	Assess	SA	1985	2.8072	
Irwin Twp. (G-164)	42E12/NW	54a. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7609	
Irwin Twp. (G-164)	42E12/NW	54b. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7610	
Irwin Twp. (G-164)	42E12/NW	54c. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7612	
Irwin Twp. (G-164)	42E12/NW	54d. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7741	
Leduc Twp. (G-169)	42E12/NE	54e. Cowan, M. F.	Au	Assess	Mag	1984	2.7747	
Leduc Twp. (G-169)	42E12/NE	54f. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7746	
Leduc Twp. (G-169)	42E12/NE	54g. Cowan, M. F.	Au	Assess	Mag	1984	2.7742	
McBean Twp. (G-321)	42E10/NE	54h. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7743	
Sandra Twp. (G-167)	42E12/NW	54i. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7744	
Walters Twp. (G-171)	42E12/NE	54j. Cowan, M. F.	Au	Assess	GL, Mag	1984	2.7745	
Tyrol Lake Area/ Pifher Twp. (G-141)	42E13/SW	55. Cowan, Sol (Minefinders Property)	Au	Assess	Mag	1984	2.7249	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G-630)	42D9/NE	56. Crescent Mines Ltd. (Amendalagine, M.)	Au	Assess	AEM, VLF, Mag	1983	2.7138	
Maun Lake Area (G-319)	42L7/NW	57. Culhane, P. (Theriault, O.) (Lacana Mining Corp.)	Au	Assess	VLF, Mag	1984	2.7049	
Moss Twp. (G-676)	52B10/SW	58a. Cumberland Resources Ltd. (Moss Lake Property)	Au	Assess	Geochem (S), SA	1984	2.7222	
Santoy Lake Area (G-612), Syine Twp. (G-634)	42D15/NW	58b. Cumberland Resources Ltd.	Au, Bm	Assess	GL	1984	2.7129	
Tuuri Twp. (G-635), Walsh Twp. (G-636)	42D15/SW/SE	58c. Cumberland Resources Ltd.	Au, Bm	Assess	SA	1983	2.7240	
Tuuri Twp. (G-635), Walsh Twp. (G-636)	42D15/SW	58d. Cumberland Resources Ltd. (Dynamic Oil Ltd.) (Redfern Resources Ltd.) (Saco Resources Ltd.)	Au, Bm	Assess	Geochem (S)	1983	2.6648	
Tuuri Twp. (G-635)	42D15/SW	58e. Cumberland Resources Ltd. (Dynamic Oil Ltd.) (Redfern Resources Ltd.) (Saco Resources Ltd.)	Au, Bm	Assess	GL	1984	2.7559	
Tuuri Twp. (G-635)	42D15/SW	58f. Cumberland Resources Ltd. (Dynamic Oil Ltd.) (Redfern Resources Ltd.) (Saco Resources Ltd.)	Au, Bm	Assess	DD 8-487.07 m	1984	-	
Walsh Twp. (G-636)	42D15/SE	58g. Cumberland Resources Ltd. (Deadhorse Creek Property)	Au, Bm	Assess	Geochem (S), SA, GL	1984	2.8185	
Saganagons Lake Area (G-555)	52B7/SW	59. Curran Bay Resource Ltd.	Au	Assess	GL, VLF, Mag	1984	2.7146	
Syine Twp. (G-634)	42D15/SW	60. Decker Resources Ltd. (Little Santoy Lake Property)	Au, Bm	Assess	GL	1984	2.7343	
Seeley Lake Area (G-613)	42D16/SW	61. Delhi Pacific Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.7097	
Rich Lake Area (G-388)	52P9/SE	62. Dempster, L. (Londry, J.)	Au	Assess	Geochem (S), VLF, Mag	1984	2.7897	
Rous Lake Area (G-611)	42D9/NE	63. Devonian Resources Ltd.	Au	OMEP	PR	1982	63.4202	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW, 42C13/SW	64. Dolphin Explor. Ltd. (Gracey, K. A.)	Au	Assess	GL	1983	2.6947	
Lindsley Twp. (G-483)	42E11/NE	65a. Dome Explor. (Can.) Ltd.	Au	Assess	DD 3-559.61 m	1984	-	
Lindsley Twp. (G-483)	42E11/NE	65b. Dome Explor. (Can.) Ltd.	Au	Assess	DD 2-367.58 m	1985	-	
Linklater Lake Area (G-69)	52I10/SW	65c. Dome Explor. (Can.) Ltd. (Project 232-C)	Au	Assess	EM, Mag	1985	2.8493	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Talbot Lake Area (G-426)	52P15/SW	65d. Dome Explor. (Can.) Ltd. (Project 232-B)	Au	Assess	EM, Mag	1985	2.8319	
Lower Aguasabon Lake Area (G-599)	42D14/NE	66. Duration Mines Ltd.	Au	Assess	GL, VLF, Mag	1984	2.7825	
Tuuri Twp. (G-635)	42D15/SW	67. Duquette, Louis E.	Au	Assess	Man Work, Mech Work	1984	-	
Molson Lake Area (G-603)	42C12/NW	68. Eagle River Mines Ltd. (Berle Oil Corp. Property)	Au	Assess	Geochem (S)	1983	2.7043	
Pic Twp. (G-630)	42D9/NW	69. Eldor Resources Ltd.	Au	Assess	GL, VLF, Mag	1984	2.7574	
Pic Twp. (G-630)	42D9/NW	70. Empire Resources Ltd. (Pezim, M.) (Clemiss, A.)	Au	Assess	SA, Geochem (S), GL	1983	2.6948	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	71a. Enterprise Develop. Corp.	Au	OMEP	PR	1982	63.4224	
Molson Lake Area (G-603)	42C12/NW	71b. Enterprise Develop. Corp.	Au	Assess	SA, Geochem (S), GL	1983	2.6946	
Pic Twp. (G-630)	42D9/NW	72a. Esso Resources Canada Ltd.	Au	Assess	DD 2-336.5 m	1984	-	
Pic Twp. (G-630)	42D9/NW	72b. Esso Resources Canada Ltd. (Toothpick Prospect)	Au	Assess	GL	1985	2.8460	
Pic Twp. (G-630)	42D9/NW	72c. Esso Resources Canada Ltd.	Au	Assess	DD 9-1841 m	1985	-	
Martinet Lake Area (G-601), Cirrus Lake Area (G-587)	42D16/NW/ NE	73. Exall Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.7192	
Klotz Lake Area (G-295)	42F13/SW	74a. Explor. Banque Or (Martin, P.)	Au	OMEP	PR, SA, GL	1982	63.4039	
Klotz Lake Area (G-295)	42F13/SW	74b. Explor. Banque Or (Martin, P.)	Au	OMEP	PR, SA, GL	1983	63.4218	
Sawbill Bay Area (G-558), Finlayson Lake Area (G-528)	52B14/NW, 52B13/NE	75a. Falconbridge Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.8214	
Sawbill Bay Area (G-558)	52B14/NW	75b. Falconbridge Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.8215	
Miminiska Lake Area (G-332), Nesting Lake Area (G-342)	52P10/SE/ NE	76. Felmont Oil Corp. (New Jersey Zinc Co. (Can.) Ltd.)	Au, Sb	Assess	SA	1984	2.7348	
Syine Twp. (G-634)	42D15/SW	77a. Ferguson, A.	Au	Assess	Man Work	1984	-	
Syine Twp. (G-634)	42D15/SW	77b. Ferguson, A.	Au	Assess	Mech Work	1984	-	
Syine Twp. (G-634)	42D15/SW	77c. Ferguson, A. (Phantom Explor. Services Ltd.)	Au	Assess	VLF, Mag	1984	2.7157	
Finlayson Lake Area (G-528)	52B13/NE	78a. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Mech Work	1984	-	
Freeborn Twp. (G-570), Miranda Lake Area (G-543)	52B13/SE/ SW	78b. Fern Elizabeth Gold Explor. Ltd. (Moffatt, R. C.)	Au	Assess	Man Work, Mech Work, STr	1984	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Freeborn Twp. (G-570)	52B13/SE/SW	78c. Fern Elizabeth Gold Explor. Ltd. (Camflo Mines) (Elizabeth Mine)	Au	Assess	SA	1984/85	2.8073	
Freeborn Twp. (G-570)	52B13/SE/SW	78d. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Man Work, Mech Work, STr	1985	-	
Hutchinson Twp. (G-571)	52B14/SW	78e. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	STr, Man Work, Mech Work	1983	-	
Hutchinson Twp. (G-571)	52B14/SW	78f. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Man Work, Mech Work, STr	1984	-	
Sabawi Lake Area/ McCaul Twp. (G-554)	52B14/SW	78g. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	Man Work, Mech Work, STr	1983	-	
Sabawi Lake Area/ McCaul Twp. (G-554)	52B14/SW	78h. Fern Elizabeth Gold Explor. Ltd.	Au	Assess	STr, Mech Work	1984	-	
Seeley Lake Area (G-613)	42D16/SW	79. Filo, Kevin	Au	Assess	SA	1983	2.6299	
Lower Aguasabon Lake Area (G-599), Priske Twp. (G-631)	42D14/NE	80. Flint Rock Mines Ltd.	Au, Bm	Assess	EM, Mag	1984	2.7151	
Springer Lake Area (G-413), Bartman Lake Area (G-202), Mameigwess Lake Area (G-316), Owen Lake Area (G-364), Wapitotem Lake Area (G-447)	43D5/NE, 43D12/SE/SW, 43D6/SW, 43D5/NW	81a. Forester Resources Inc. (Lansdowne House Project) (Leliever, Robert)	Au	Assess	AEM, A Mag	1984	2.7318	
Wapitotem Lake Area (G-447)	43D5/NW	81b. Forester Resources Inc. (Lansdowne Project)	Au	Assess	Man Work, STr, DD 3-280.72 m	1984	-	
Pic Twp. (G-630)	42D9/NE	82. Fourstar Petroleum Resources Ltd. (Swede Creek Project)	Au	Assess	VLF, Mag	1985	2.8575	
Hanover Lake Area (G-266)	42L6/SE	83a. Fowler, Jonathan (Monopros Ltd.)	Au	Assess	Mag	1985	2.8106	
Hanover Lake Area (G-266), Rupert Twp. (G-500)	42L6/SE	83b. Fowler, Jonathan (Monopros Ltd.)	Au	Assess	Mag	1985	2.8107	
Strey Twp. (G-633)	42D14/SE	84. Franklin Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1983	2.7083	
Pic Twp. (G-630)	42D9/SW	85a. FTM Resources Inc.	Au	Assess	VLF, Mag	1984	2.7554	
Pic Twp. (G-630)	42D9/SE	85b. FTM Resources Inc. (Black River Claim Group)	Au	Assess	VLF, Mag	1984	2.7555	
Klotz Lake Area (G-295), Castlebar Lake Area (G-220)	42F13/SW, 42E16/SE	86a. Getty Canadian Metals Ltd.	Au	Assess	SA, DD 1-152 m	1983/84	2.7684	
Klotz Lake Area (G-295)	42F13/SW	86b. Getty Canadian Metals Ltd.	Au	Assess	GL	1984	2.7519	
Klotz Lake Area (G-295), Pagwachuan Lake Area (G-368), Castlebar Lake Area (G-220)	42F13/SW, 42E9/NE, 42E16/SE	86c. Getty Canadian Metals Ltd.	Au	Assess	VLF, Mag	1984	2.8042	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Conacher Twp. (G-646)	52B9/NE	87a. GLE Resources Ltd. (Lincoln Resources Inc.)	Au	Assess	DD 1-160.63 m	1984	-	
Conacher Twp. (G-646)	52B9/SE	87b. GLE Resources Ltd. (Lincoln Resources Inc.)	Au	Assess	DD 1-146.61 m	1985	-	
Hagey Twp. (G-661)	52B9/NE	87c. GLE Resources Ltd.	Au	OMEP	PR, EM, Mag, IP, DD 6-617.22 m	1983	63.4194	
Hagey Twp. (G-661), Conacher Twp. (G-646)	52B9/NE	87d. GLE Resources Ltd. (Lincoln Resources Inc.)	Au	Assess	Geochem (S), SA	1984	2.7517	
Hagey Twp. (G-661)	52B9/NE	87e. GLE Resources Ltd. (Lincoln Resources Inc.)	Au	Assess	GL	1985	2.8543	
Pic Twp. (G-630)	42D9/NW	88. Glitter Gold Mines Ltd.	Au	Assess	GL	1984	2.8376	
Dawson Road Lots (G-649)	52A12/SW	89. Godzik, Alex	Au	Assess	STr, Mech Work	1984	-	
Lecours Twp. (G-2863)	42D9/NE	90a. Gold Fields Canadian Mining Ltd.	Au	Assess	DD 1-304.49 m	1985	-	
Rous Lake Area (G-611), Lecours Twp. (G-2863)	42D9/NE	90b. Gold Fields Canadian Mining Ltd. (Int.'l Rhodes Resources Property) (Jack Criswell Resources Ltd. Property) (Int.'l Laco Resources Property) (Triple Crown Resources Ltd. Property) (Youngman Oil & Gas Ltd. Property) (Rabbit Oil & Gas Ltd. Property)	Au	Assess	DD 9-5291.93 m	1985	-	
Lecours Twp. (G-2863)	42D9/NE	91a. Golden Century Resources Corp. (HRC Hemlo Resources Corp.)	Au	Assess	Geochem (S)	1984	2.7889	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW, 42C13/SW	91b. Golden Century Resources Corp. (HRC Hemlo Resources Corp.) (Gaby Lake Property)	Au	Assess	VLF, Mag	1983	2.7354	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW, 42C13/SW	91c. Golden Century Resources Corp.	Au	Assess	Geochem (S)	1983	2.7333	
Rous Lake Area (G-611)	42D9/NE	91d. Golden Century Resources Corp. (HRC Hemlo Resources Corp.)	Au	Assess	GL	1984	2.7324	
White Lake (North) Area (G-622), White Lake (South) Area (G-623)	42C13/SE, 42C12/NE	91e. Golden Century Resources Corp. (HRC Hemlo Resources Corp.)	Au	Assess	GL	1984	2.7721	
Summers Twp. (G-165)	42E12/NW	92. Golden Crown Resources Ltd. (Boos, B.)	Au	Assess	Geochem (S), SA, EM	1984	2.7650	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Croll Twp. (G-491), Coltham Twp. (G-481)	42E10/NW/NE	93a. Golden Pond Resources/ Metallgesellscaft Canada Ltd. Joint Venture	Au	Assess	GL	1984	2.8120	
Croll Twp. (G-491) Coltham Twp. (G-481)	42E10NW/NE	93b. Golden Pond Resources/ Metallgesellscaft Canada Ltd. Joint Venture (Geraldton Project)	Au	Assess	VLF, Mag	1984	2.7623	
Summers Twp. (G-165)	42E12/NW	94. Golden Seal Resources Ltd.	Au	Assess	Geochem (S), EM	1984	2.7653	
Castlebar Lake Area (G-220), Klotz Lake Area (G-295)	42E16/SE, 42F13/SW	95a. Golden Tiger Mining Explor. Co. Inc.	Au	Assess	VLF	1985	2.8310	
Castlebar Lake Area (G-220)	42E16/SE	95b. Golden Tiger Mining Explor. Co. Inc.	Au	Assess	GL, VLF, Mag	1985	2.8058	
Castlebar Lake Area (G-220)	42E16/SE	95c. Golden Tiger Mining Explor. Co. Inc.	Au	Assess	VLF, Mag	1985	2.8057	
Dorion Twp. (G-651), Greenwich Lake Area (G-2705)	52A15/SE/SW	95d. Golden Tiger Mining Explor. Co. Inc. (Exchange Mining Holdings Ltd. Option)	Au	Assess	SA, GL (Map only), DD 4-305.40 m	1984	-	
Greenwich Lake Area (G-2705), Dorion Twp. (G-651)	52A15/SW/SE	95e. Golden Tiger Mining Explor. Co. Inc.	Au	Assess	GL, VLF, Mag	1984	2.7398	
Klotz Lake Area (G-295)	42F13/SW	95f. Golden Tiger Mining Explor. Co. Inc.	Au	Assess	VLF, Mag	1985	2.8361	
Syine Twp. (G-634)	42D15/SW	96a. Goldhurst Resources Inc. (Hamel, Raymond J.)	Au	Assess	GL, VLF, Mag	1983	2.7578	
Syine Twp. (G-634)	42D15/SW	96b. Goldhurst Resources Inc. (Hamel, Raymond J.)	Au	Assess	GL (Map only), DD 4-305.10 m	1984	-	
Lower Aguasabon Lake Area (G-599)	42D14/NE	97. Goldpac Investments Ltd.	Au, Bm	Assess	VLF, Mag	1985	2.7965	
Seeley Lake Area (G-613), Lorna Lake Area (G-598)	42D16/SW/SE	98. Gowganda Resources Inc. (Homestake Mineral Develop. Co.)	Au	Assess	GL	1984	2.7364	
Lower Aguasabon Lake Area (G-599)	42D14/NE	99. Gracey, K. (in trust) (Rich Resources Ltd.)	Au	Assess	Geochem (S), GL	1983	2.7165	
Tuuri Twp. (G-635)	42D15/SW	100. Grandview Resources Inc. (Steel River Property)	Au, Bm	Assess	VLF, Mag	1984	2.7376	
Pic Twp. (G-630)	42D9/NW	101. Grant Explor. Ltd. (Pezim, Murray)	Au	Assess	Geochem (S), SA, GL	1984	2.6949	
Elmhirst Twp. (G-162)	42E13/SE/SW	102. Grant, John S. (Elmhirst Lake Syndicate)	Au	Assess	SA, VLF, Geochem (S)	1984	2.6985	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Oliver Twp. (G-679)	52A5/NE	103. Grayson, Leonard (Moore, Paul)	Au	Assess	STr, Mech Work	1985	-	
MacGregor Twp. (G-672)	52A10/SW	104. Greive, M. D.	Amy	Assess	Man Work, Mech Work	1983/84	-	
Syine Twp. (G-634), Lower Aguasabon Lake Area (G-599)	42D14/NE	105. Greyhawk Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1984	2.8052	
Powell Lake Area (G-549)	52B7/NW	106. Gunflint Resources Ltd. (Artic Atlantic Explors. Ltd.)	Au	Assess	Geochem (S), SA, GL	1984	2.7967	
Syine Twp. (G-634)	42D15/SW	107. Paul Hahn & Co. Ltd.	Au	Assess	Geochem (r)	1984	2.6978	
Middle Fox Lake Area/Yesno Twp. (G-85)	42D13/NE	108a. Halonen, L.	Amy	Assess	Man Work, Mech Work	1984	-	
Middle Fox Lake Area/Yesno Twp. (G-85)	42D13/NE	108b. Halonen, L.	Amy	Assess	Man Work, Mech Work	1985	-	
Middle Fox Lake Area/Yesno Twp. (G-85)	42D13/NE	108c. Halonen, L	Amy	Assess	Man Work, Mech Work	1985	-	
Walsh Twp. (G-636)	42D15/SE	109. Halonen, V.	Au	Assess	Man Work, Mech Work	1984	-	
McComber Twp. (G-166), Summers Twp. (G-165)	42E12/SW	110. Hanna Mines (Hopkins, Albert) (Galley, David)	Au	OMEP	PR	1982	63.4018	
McTavish Twp. (G-675)	52A10/SE	111. Hansen, Erik	Amy	Assess	Mech Work, Man Work, STr	1985	-	
Walters Twp. (G-171)	42E12/NE	112a. Harte Resources (Hames, Clifford)	Au	OMEP	PR	1982	63.4186	
Walters Twp. (G-171)	42E12/NE	112b. Harte Resources	Au	Assess	SA, DD 3-302.66 m	1984	-	
Lorna Lake Area (G-598), Seeley Lake Area (G-613)	42D16/SE/SW	113. Hemlar Resources Explor. Ltd. (St. Pierre, Dan) (Goodchild Creek Gold Property)	Au	Assess	VLF	1984	2.7176	
Wabikoba Lake Area (G-620)	42C13/SW	114. Hemlo Explor. Ltd.	Au	OMEP	PR	1982	63.4229	
Vincent Twp. (G-163)	42E12/NE	115a. Highland-Crow Resources Ltd.	Au	Assess	DD 3-440.43 m	1984	-	
Vincent Twp. (G-163)	42E12/NE	115b. Highland-Crow Resources Ltd.	Au	Assess	SA	1984	2.8076	
Syine Twp. (G-634)	42D15/SW, 42D14/SE	116. Highmark Resources Ltd. (MacMillan Energy Ltd.) (Schiralli, Rocco)	Au, Bm	Assess	Geochem (S), GL, VLF, Mag, SA	1983/84	2.8192	
Tyrol Lake Area (G-141)	42E13/SW	117a. Hillsborough Explor. Ltd.	Au	OMEP	PR	1981	63.3993	
Tyrol Lake Area (G-141)	42E13/SW	117b. Hillsborough Explor. Ltd.	Au	Assess	STr	1984	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Tyrol Lake Area (G-141)	42E13/SW	117c. Hillsborough Explor. Ltd.	Au	Assess	Man Work	1984	-	
Oboshkegan Twp. (G-173), Metcalfe Lake Area (G-84)	42L4/NE	118. Holmer Gold Mines Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.7879	
Meader Twp. (G-168)	42E13/SW	119a. Holmwood Resources Ltd.	Au	Assess	VLF, Mag	1984	2.7086	
Meader Twp. (G-168)	42E13/SW	119b. Holmwood Resources Ltd.	Au	Assess	DD 1-39.01 m	1985	-	
Rous Lake Area (G-611), Molson Lake Area/Wabikoba Lake Area (G-620), Lorna Lake Area (G-598)	42D9/NE, 42C12/NW, 42C13/SW, 42D16/SE	120a. Homestake Mineral Develop. Co. (Captain Cons./Koala Resources)	Au	Assess	IP, Res	1984	2.7236	
Seeley Lake Area (G-613), Lorna Lake Area (G-598)	42D16/SW/SE	120b. Homestake Mineral Develop. Co. (Gowganda Resources Property)	Au	Assess	Res, IP	1984	2.8341	
Wabikoba Lake Area/Molson Lake Area (G-620)	42C13/SW, 42C12/NW	120c. Homestake Mineral Develop. Co. (Regal Petroleum Ltd.)	Au	Assess	Geochem (S), SA	1983	2.7399	
Wabikoba Lake Area/Molson Lake Area (G-620)	42C13/SW, 42C12/NW	120d. Homestake Mineral Develop. Co. (Regal Petroleum Ltd.)	Au	Assess	IP, Res	1984	2.7235	
Moss Twp. (G-676)	52B10/SW	121. Huronian Mines Ltd.	Au, Cu	Assess	VLF, Mag	1984	2.7246	
Molson Lake Area (G-603)	42C12/NW	122a. Huston, C. D. (Aupan Red Lake Resources Ltd.) (Cedar Lake Property)	Au	Assess	VLF, Mag	1984	2.7243	
Wabikoba Lake Area (G-620)	42C13/SW	122b. Huston, C. D.	Au	Assess	STr	1983	-	
Sabawi Lake Area/McCaul Twp. (G-554)	52B14/SW	123a. Ican Resources Ltd.	Au	Assess	DD 4-618.13 m	1984	-	
Sabawi Lake Area/McCaul Twp. (G-554)	52B14/SW	123b. Ican Resources Ltd.	Au	Assess	DD 4-669.03 m	1984	-	
Seeley Lake Area (G-613)	42D16/SW	124. Ingamar Explors. Ltd. (Colby East/West Property)	Au	Assess	DD 5-883 m, SA	1984	-	
Rous Lake Area (G-611)	42D9/NE	125. Inter-Continental Energy Corp.	Au	OMEP	PR	1982	63.4203	
Smiley Lake Area (G-762)	52A14/NW	126a. Jackson, Paul A. (Eureka Explor. Syndicate)	Au, Cu, Zn	Assess	SA, GL	1984	2.7433	
Wardrope Twp./Orbit Lake Area (G-748)	52A13/NW	126b. Jackson, Paul A. (Eureka Explor. Syndicate)	Au, Cu, Zn	Assess	SA, GL	1984	2.7432	
Dawson Road Lots (G-649)	52A12/SW	127a. Jalna Resources Ltd. (Morehouse, William D.)	Au	Assess	AEM, VLF, A Mag	1985	2.8265	
Duckworth Twp. (G-638), Laurie Twp. (G-669), Batwing Lake Area (G-699)	52B9/SE, 52A12/SW, 52B8/NE	127b. Jalna Resources Ltd.	Au	Assess	Man Work, Mech Work, STr	1984	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Duckworth Twp. (G-638)	52B9/SE	127c. Jalna Resources Ltd. (Gold Creek Project) (Goldore Joint Venture)	Au	Assess	SA, PR	1984	2.7577	
Duckworth Twp. (G-638)	52B9/SE	127d. Jalna Resources Ltd. (Anaconda Canada Explor. Ltd.)	Au	Assess	SA, DD 13-1118 m	1985	2.8204	
Duckworth Twp. (G-638), Laurie Twp. (G-669), Batwing Lake Area (G-699)	52B9/SE, 52A12/SW, 52[illegible]/NE	127e. Jalna Resources Ltd. (Gold Creek Property)	Au	Assess	A Mag, VLF, AEM	1985	2.8266	
Summers Twp. (G-165)	42E12/NW	128. Jedi Resources Ltd. (Antoniou, Antonios)	Au	Assess	EM, SA	1984	2.7649	
Keezhik Lake (East Arm) Area (G-288)	52P16/SW	129. Jet Mining Corp.	Au	Assess	AEM, A Mag	1985	2.8508	
Pic Twp. (G-630)	42D9/NW	130. Joa, Melvin (Busch, R.)	Au	Non-Assess	PR	1982	2.6567	
Priske Twp. (G-631)	42D14/SE	131. Jolin, Andre	Au	Assess	VLF, HLEM, Mag	1984	2.7856	
Pic Twp. (G-630)	42D9/NW	132a. Kadrey Energy Corp.	Au	Assess	DD 7-1023.21 m	1983	-	
Pic Twp. (G-630)	42D9/NW	132b. Kadrey Energy Corp.	Au	Assess	IP, Res	1983	2.6808	
Pic Twp. (G-630)	42D9/NW	132c. Kadrey Energy Corp. (Pezim, M.) (Clemiss, A.)	Au	Assess	Geochem (S), SA, GL	1984	2.6998	
MacGregor Twp. (G-672)	52A10/SW	133. Karkkainen, Alpo	Amy	Assess	STr	1983/84	-	
Wabikoba Lake Area (G-620)	42C13/SW	134. Kasner, R. J. (Hemlo Reef Resources)	Au	OMEP	PR	1983	63.4220	
Frond Lake Area (G-252)	52P9/SW	135a. Keezic Resources Ltd.	Au	OMEP	Geochem, PR, EM, Mag	1982	63.3995	
Frond Lake Area (G-252)	52P9/SW	135b. Keezic Resources Ltd.	Au	OMEP	Geochem	1983	63.4193	
Elmhirst Twp. (G-162)	42E13/SE	136. Kengate Resources Ltd.	Au	OMEP	PR	1982	63.4215	
Martin Lake Area (G-79), Castlewood Lake Area (G-22)	42E13/NW/NE	137a. Kerr Addison Mines Ltd.	Au	Assess	Geochem (S), (r), GL	1983	2.6263	
Durer Lake Area (G-228)	42L10/NW	137b. Kerr Addison Mines Ltd.	Au	Assess	Geochem (S), (r), GL	1983	2.6445	
Durer Lake Area (G-228), Speckled Trout Rapids Area (G-412), Ogoki Lake Area (G-357), Tennant Lake Area (G-428)	42L10/NW, 42L15/SW, 42L14/SE, 42L11/NE	137c. Kerr Addison Mines Ltd.	Au	Assess	VLF, Mag	1984	2.7372	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Junior Lake Area (G-57)	42L5/NW	137d. Kerr Addison Mines Ltd.	Au	Assers	Geochem (S), (r), GL	1983	2.6334	
McComber Twp. (G-166), Vincent Twp. (G-163), Leduc Twp. (G-169)	42E12/SW/NE	137e. Kerr Addison Mines Ltd.	Au	Assess	Geochem (S), (r), GL	1983	2.6557	
Opikeigan Lake Area (G-361), Rich Lake Area (G-388)	52P9/NE/SE	137f. Kerr Addison Mines Ltd.	Au	Assess	GL	1984	2.7685	
Percy Lake Area (G-377)	42L10/NE	137g. Kerr Addison Mines Ltd.	Au	Assess	Geochem (S), (r), SA, GL	1983	2.6446	
Rich Lake Area (G-388), Opikeigan Lake Area (G-361)	52P3/SE/NE	137h. Kerr Addison Mines Ltd.	Au	Assess	Geochem (r)	1984	2.8021	
Rich Lake Area (G-388), Opikeigan Lake Area (G-361)	52P9/SE/NE	137i. Kerr Addison Mines Ltd.	Au	Assess	VLF, Mag	1985	2.8229	
Speckled Trout Rapids Area (G-412), Durer Lake Area (G-228), Tennant Lake Area (G-428), Ogoki Lake Area (G-357)	42L15/SW, 42L10/NW, 42L11/NE, 42L14/SE	137j. Kerr Addison Mines Ltd. (Melchett Lake Property)	Au	Assess	Geochem (S), (r), GL	1983	2.6442	
Speckled Trout Rapids Area (G-412), Durer Lake Area (G-228), Percy Lake Area (G-377), Painter Lake Area (G-370)	42L15/SW, 42L10/NW/NE, 42L 15/SE	137k. Kerr Addison Mines Ltd. (Colpitts Lake Property)	Au	Assess	Geochem (S), (r), SA, GL	1983	2.6444	
Tennant Lake Area (G-428)	42L11/NE	137l. Kerr Addison Mines Ltd.	Au	Assess	Geochem (S), GL	1983	2.6443	
Toronto Lake Area (G-140)	42L5/SW	137m. Kerr Addison Mines Ltd.	Au	Assess	Geochem (S), (r), GL	1983	2.6333	
Wabikoba Lake Area (G-620)	42C13/SW	138a. Key Lake Explor. Ltd. (Dillman, E. M.)	Au	Assess	GL	1983	2.7408	
Wabikoba Lake Area (G-620)	42C13/SW	138b. Key Lake Explor. Ltd. (Brandy Brook Mines Ltd.) (Dillman, E. M.)	Au	Assess	VLF, Mag	1983	2.7409	
Tuuri Twp. (G-635)	42D15/SW	139. Kingdom Resources Ltd.	Au	Assess	SA, Geochem (S)	1984	-	
Steeprock Lake Area (G-560)	52B13/SE	140. Klug, Fred (Wicheruk, Mitch)	Au	Assess	Man Work, STr	1984	-	
Puddy Lake Area (G-118)	52H13/NE	141. Kuhner, Knut C.	Pd, Pt	Assess	Mech Work	1985	-	
Hutchinson Twp. (G-571)	52B14/SW	142. Labrador Mining & Explor. Co. Ltd. (Hill Property)	Au	Assess	DD 10-1053.98 m	1985	-	
Molson Lake Area/ Bomby Twp. (G-3173), Brothers Twp. (G-3172)	42C12/NW	143a. Lac Minerals Ltd.	Au	Assess	DD 12-2508.25 m (*all drilling done on SSM claims)	1984	-	
Molson Lake Area/ Bomby Twp. (G-3173)	42C12/NW	143b. Lac Minerals Ltd.	Au	Assess	DD 2-120.8 m	1985	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Maun Lake Area (G-319)	42L7/NW	144. Lacana Mining Corp. (Culhane, P.) (Theriault, O.)	Au	Assess	GL, VLF	1984	2.7615	
Rous Lake Area (G-611)	42D9/NE	145. Laco Resources Inc.	Au	OMEP	PR	1982	63.4223	
Lorna Lake Area (G-598), Seeley Lake Area (G-613)	42D16/SE/SW	146. Lavoie, Richard (St. Pierre, Dan) (Lough/Hibbard Group)	Au	Assess	GL	1984	2.7359	
Hepburn Lake Area (G-532)	52C16/SE	147a. Laws, Gregory	Au	Assess	Man Work, Mech Work	1985	-	
Hepburn Lake Area (G-532)	52C16/SE	147b. Laws, Gregory	Au	Assess	SA	1985	2.8308	
Lower Aguasabon Lake Area (G-599)	42D14/NE	148. Lazurus/Rich/Hercules Resources (Gracey, K. A.) (Orequest Consultants Ltd.)	Au	Assess	AEM, VLF, A Mag	1984	2.7304	
Hagey Twp. (G-661)	52B9/NE	149. Lincoln Resources Inc. (Calvert, Daniel) (Cal-Chris Group)	Au	Assess	GL	1985	2.8448	
Priske Twp. (G-631)	42D14/SW/SE	150. Lobo Explor. Co. Ltd.	Au, Bm	Assess	AEM, VLF, A Mag	1984	2.7273	
Lower Aguasabon Lake Area (G-599), Strey Twp. (G-633)	42D14/NE/SE	151. Lunar Resources Ltd. (Gracey, K. A.)	Au	Assess	Geochem (S), SA, GL	1984	2.7166	
Molson Lake Area (G-603)	42C12/NW	152a. Lynx Canada Explor. Ltd.	Au	Assess	DD 10-1305 m	1983	-	
Pic Twp. (G-630)	42D9/NW	152b. Lynx Canada Explor. Ltd.	Au	Assess	GL, VLF	1984	2.7560	
Pic Twp. (G-630)	42D9/NW	152c. Lynx Canada Explor. Ltd.	Au	Assess	SA	1984	2.7045	
Pic Twp. (G-630)	42D9/NW	153a. Lytton Minerals Ltd. (Stenlund, Victor)	Au	Assess	GL, VLF, Mag	1984	2.7946	
Pic Twp. (G-630)	42D9/NW	153b. Lytton Minerals Ltd.	Au	Assess	GL, VLF, Mag	1984	2.7948	
Pic Twp. (G-630)	42D9/NW	153c. Lytton Minerals Ltd. (The Ontario Paper Co. Ltd.) (Peekongay Property)	Au	Assess	DD 1-212.5 m	1985	-	
Molson Lake Area/Brothers Twp. (G-3172)	42C12/NW	154. MacDonnell, Angus (MacDonnell Geophysics) (Cedar Lake Property)	Au	Assess	SP, Mag	1984	2.7480	
Pic Twp. (G-630)	42D9/NW	155. MacKenzie Energy Corp. (Pezim, M.) (Clemiss, A.)	Au	Assess	SA, Geochem (S), GL	1983	2.6945	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Vein Lake Area (G-619)	42E1/NW	156. MacRae, G. (Joa, M.) (Stiebrins, E.) (Drainage Lake Property)	Pt, Pd	Assess	SA, Geochem, GL, Mag	1984	2.7864	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	157. Magenta Develop. Corp.	Au	Assess	GL	1985	2.8534	
Gorham Twp. (G-660)	52A11/SW	158. Maki, Mark	Au	Assess	Man Work, STr	1984	-	
Vincent Twp. (G-163)	42E12/NE	159. Maki, Neil	Au	OMEP	Tr	1982	63.4195	
Coltham Twp. (G-481)	42E10/NW	160a. Malouf, M. (Geraldton Longlac Gold Inc.)	Au	Assess	EM, Mag	1984	2.7267	
McBean Lake Area (G-321)	42E10/NE	160b. Malouf, M. (Fereau Resources Inc.)	Au	OMEP	Tr, PR	1982	63.4211	
Ashmore Twp. (G-472), McKelvie Twp. (G-484)	42E10/NW	160c. Malouf, M.	Au	Assess	STr	1984	-	
Lower Aguasabon Lake Area (G-599), Santoy Lake Area (G-612)	42D14/NE, 42D15/NW	161. Manitou Reef Resources Ltd. (563056 Ontario Ltd.) (Thompson, D.)	Au	Assess	Geochem (S), (r), SA, GL	1984	2.7640	
Haines Twp. (G-662), Hagey Twp. (G-661), Kashibowie Lake Area (M-2405)	52B9/NW	162. Maple Leaf Petroleum Ltd. (511735 Ontario Ltd.)	Au	Assess	VLF	1985	2.8054	
McTavish Twp. (G-675)	52A10/NE	163a. Marino, Peter (Marino, John)	Amy	Assess	Man Work, STr	1984	-	
McTavish Twp. (G-675)	52A10/NE	163b. Marino, Peter (Marino, John)	Amy	Assess	Mech Work, Man Work, STr	1984	-	
McTavish Twp. (G-675)	52A10/NE	163c. Marino, Peter (Marino, John)	Amy	Assess	Man Work, Mech Work, STr	1985	-	
McTavish Twp. (G-675)	52A10/NE	163d. Marino, Peter (Marino, John)	Amy	Assess	STr, Man Work, Mech Work	1985	-	
Conacher Twp. (G-646)	52B9/NE	164a. Mattagami Lake Explor. Ltd. (Noranda Explor. Co. Ltd.) (Band-Ore Property)	Au	Assess	Geochem (S), SA	1985	2.8368	
Hagey Twp. (G-661)	52B9/NE	164b. Mattagami Lake Explor. Ltd. (Noranda Explor. Co. Ltd.)	Au	Assess	VLF	1984	2.7502	
Hagey Twp. (G-661)	52B9/NE/ SE	164c. Mattagami Lake Explor. Ltd. (Noranda Explor. Co. Ltd.) (Band-Ore Gold Mines Ltd.)	Au	Assess	Geochem (S), SA	1984	2.7503	
Hagey Twp. (G-661)	52B9/NE	164d. Mattagami Lake Explor. Ltd.	Au	Assess	Geochem (S), SA	1984	2.7764	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hagey Twp. (G-661)	52B9/SE	164e. Mattagami Lake Explor. Co. Ltd. (Band-Ore Extension Property)	Au	Assess	DD 4-119.14 m, SA	1985	2.8446	
Wabikoba Lake Area (G-620), White Lake (North) Area (G-622)	42C13/SW/SE	165a. McGowan, R. J.	Au	Assess	VLF, Mag	1984	2.7994	
Wabikoba Lake Area (G-620)	42C13/SW	165b. McGowan, R. J. (Theresa Lake Property)	Au	Assess	GL, VLF, Mag	1984	2.7441	
White Lake (North) Area (G-622)	42C13/SE	165c. McGowan, R. J. (Midnapore Resources Inc.)	Au	Assess	SA	1984	2.7314	
White Lake (North) Area (G-622)	42C13/SE	165d. McGowan, R. J. (Theresa Lake Option)	Au	Assess	DD 3-304.8 m, SA	1985	-	
Summers Twp. (G-165)	42E12/NW	166. McMahon, Jim	Au	Assess	Man Work, Mech Work	1984	-	
Priske Twp. (G-631)	42D14/SE/SW	167a. Megalode Resources Inc.	Au	Assess	VLF, Mag	1984	2.6520	
Priske Twp. (G-631)	42D14/SE/SW	167b. Megalode Resources Inc.	Au, Bm	Assess	DD 6-592.83 m	1984	-	
Middlefox Lake Area (G-85)	42D13/NE	168. Merkoske, Leo	fl, ba	Assess	Man Work	1984	-	
Irwin Twp. (G-164)	42E12/NW	169a. Metalore Resources Ltd. (Brookbank Gold Property)	Au	OMEP	PR, VLF, DD 29-3314.7 m	1981	63.4107	
Irwin Twp. (G-164), Walters Twp. (G-171), Sandra Twp. (G-167), Leduc Twp. (G-169)	42E12/NW/NE	169b. Metalore Resources Ltd.	Au	Assess	AEM, VLF	1984	2.7430	
Irwin Twp. (G-164), Sandra Twp. (G-167), Walters Twp. (G-171), Leduc Twp. (G-169)	42E12/NW/NE	169c. Metalore Resources Ltd.	Au	Assess	AEM, A Rad	1984	2.8352	
Irwin Twp. (G-164)	42E12/NW	169d. Metalore Resources Ltd.	Au	Assess	DD 1-166.11 m	1984	-	
Irwin Twp. (G-164)	42E12/NW	169e. Metalore Resources Ltd.	Au	Assess	DD 3-227.07 m	1984/85	-	
Duckworth Twp. (G-638)	52B9/SE	170a. Micham Explor. Inc. (Walsten, D.) (Solomon, P.) (Girard, R.)	Au	Assess	AEM, VLF, A Mag	1984	2.7627	
Syine Twp. (G-634), Santoy Lake Area (G-612)	42D15/SW, 42D14/SE, 42D15/NW	170b. Micham Explor. Inc.	Au	Assess	Geochem (S)	1983	2.7985	
Syine Twp. (G-634), Santoy Lake Area (G-612)	42D15/SW/NW	170c. Micham Explor. Inc.	Au, Bm	Assess	SA	1983/84	2.8441	
Syine Twp. (G-634), Santoy Lake Area (G-612)	42D15/SW/NW	170d. Micham Explor. Inc.	Au	Assess	DD 8-969.05 m	1984	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Syine Twp. (G-634), Santoy Lake Area (G-612)	42D15/SW/NW	170e. Micham Explor. Inc.	Au, Bm	Assess	GL	1984	2.8442	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	171a. Mid Canada Explor. Services Ltd. (Battle Energy Corp. Option)	Au	Assess	IP, SA, Geochem (S), GL	1984	2.7444	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	171b. Mid Canada Explor. Services Ltd. (Battle Energy Corp.)	Au	Assess	DD 1-167.64 m	1985	-	
Abrey Twp./McBean Lake Area (G-321)	42E10/NE	172. Mid-North Engineering (Cotton Valley Resources)	Au	Assess	VLF	1984	2.7988	
Lower Aguasabon Lake Area (G-599)	42D14/NE	173. Mikkonen, R. (Patterson, T.)	Au	Assess	Man Work, Mech Work, SA	1983/84	2.6971	
Norway Lake Area (G-545)	52G3/SW	174. Mining North Explors. Ltd. (Red Paint Lake Project)	Au	OMEP	Geochem (S), (r)	1981	63.4027	
Kowkash Twp. (G-185), O'Sullivan Lake Area (G-362), Metcalfe Lake Area (G-84), Danford Twp. (G-502)	42L6/SW/NE, 42L4/NE, 42L3/NE	175a. Monopros Ltd. (Fowler, J.) (Facey-Crowther, R.)	Au	Assess	Mag	1985	2.8238	
O'Sullivan Lake Area (G-362)	42L6/NE	175b. Monopros Ltd. (Fowler, J.)	Au	Assess	Mag	1985	2.8108	
Weaver Twp. (G-576)	52B14/SE	176. Morehouse, William D.	Pt, Pd, Cu, Ni	Assess	STr	1984	-	
Priske Twp. (G-631)	42D14/SE	177a. Morgain Minerals Inc. (McKenna-McCann Property)	Au	Assess	Mech Work, SA	1984	-	
Priske Twp. (G-631)	42D14/SE	177b. Morgain Minerals Inc. (Gold Range Property)	Au	Assess	Mag	1984	2.7624	
Strey Twp. (G-633)	42D14/SE	177c. Morgain Minerals Inc. (Hays Lake Property)	Au	Assess	Mag	1984	2.7625	
Rightangle Lake Area (G-755), Max Lake Area (G-741)	52H3/NE/NW	178. Morrison, Murray S.	Au	Assess	Mag	1984	2.7175	
Factor Lake Area (G-527), Bennet Twp. (*Note: Bennet Twp. is not in the Thunder Bay Dist.)	52C9/NE, 52C16/SE/SW	179. Morrison Petroleums Ltd. (Algor Explors. Ltd.) (Fernberg, Peter)	Au	Assess	SA, Geochem (r), GL, AEM, VLF, A Mag	1984	2.7637	
Pic Twp. (G-630)	42D9/NW	180. Moses, Peter	Au	Assess	Geochem, GL, SA	1985	2.8143	
Lorna Lake Area (G-598), Cirrus Lake Area (G-587), Seeley Lake Area (G-613)	42D16/SE/NE/SW	181. MPH Consulting Ltd. (Ingamar Explor. Ltd.)	Au	Assess	AEM, VLF, A Mag	1984	2.7720	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Olie Lake Area (G-605), Loken Lake Area (G-597), Foch Lake Area (G-591), Flanders Lake Area (G-590) (*also covers SSM District)	42F5/SE, 42F4/NE, 42F3/NW, 42F6/SW	182. Murray, Brian (in trust) (North American Mining Explor. Val D'or Ltd.)	Au	Assess	VLF	1984	2.6757	
Factor Lake Area (G-527)	52C9/NE	183. Murray, William S.	Au	Assess	STr	1985	-	
Ramsay-Wright Twp. (G-573)	52B14/SW/SE	184. Nahanni Mines Ltd.	Au	OMEP	PR	1982	OM82-4-C-5	
Molson Lake Area (G-603)	42C12/NW	185a. National Trust Co. Ltd. (Corp. Trust Dept.) (Arctic Red-Pine Bell Joint Venture)	Au	Assess	DD 1-1952.7 m	1983	-	
Pic Twp. (G-630)	42D9/NW	185b. National Trust Co. Ltd. (Silver Standard Mines Ltd. Property)	Au	Assess	VLF	1984	2.7220	
Pic Twp. (G-630)	42D9/NE	185c. National Trust Co. Ltd.	Au	Assess	DD 2-377.6 m	1985	-	
Lapierre Lake Area/ Hipel Twp. (G-65)	42E14/SW	186a. Nelson, Bernhard	Au	Assess	STr	1984	-	
Lapierre Lake Area/ Hipel Twp. (G-65)	42E14/SW	185b. Nelson, Bernhard	Au	Assess	STr	1984	-	
Seeley Lake Area (G-613)	42D16/SW	187. Nelson, Joyce	Au	Assess	DD 5-355.09 m	1984	-	
Castlewood Lake Area (G-22)	42E13/NE	188. Nelson, Myron	Au	Assess	Mech Work	1985	-	
Priske Twp. (G-631), Killraine Twp. (G-625)	42D14/SW	189. New Ambrose Resources Inc. (GLE Resources Ltd.) (Lincoln Resources Inc.)	Bm, Au	Assess	SA, Geochem (S), (r)	1984	2.7478	
Klotz Lake Area (G-295)	42F13/SW	190. New Arcadia Explor. Ltd.	Au	Assess	VLF, Mag	1983	2.6234	
Linklater Lake Area (G-69)	52I10/SW	191a. New Jersey Zinc Explor. Co. (Can.) Ltd. (Gold Fields Canadian Mining Ltd.)	Au	Assess	VLF, Mag	1984	2.7089	
Snowdrift Lake Area (G-402), Nesting Lake Area (G-342)	52P10/SW/NE	191b. New Jersey Zinc Explor. Co. (Can.) Ltd.	Au, Sb	Assess	CS	1979/80	-	
Snowdrift Lake Area (G-402), Nesting Lake Area (G-342)	52P10/SW/NE	191c. New Jersey Zinc Explor. Co. (Can.) Ltd. (Felmont Oil Corp.)	Au, Sb	Assess	SA	1984	2.7349, 2.7350	
Conmee Twp. (G-647)	52A12/SE	192a. Noranda Explor. Co. Ltd. (Stewart Option)	Au	Assess	Man Work, STr	1985	-	
Duckworth Twp. (G-638)	52B9/SE	192b. Noranda Explor. Co. Ltd.	Au	Assess	Gr, GL, HLEM, Mag	1984	2.7759	
Finlayson Lake Area (G-528)	52B13/NE	192c. Noranda Explor. Co. Ltd.	Au	Assess	DD 2-213.84 m	1983	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Foch Lake Area (G-591), Roberta Twp. (G-632), Loken Lake Area (G-597)	42F3/NW, 42F4/NE	192d. Noranda Explor. Co. Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.6693	
Foch Lake Area (G-591), Loken Lake Area (G-597), McGraw Lake Area (G-602), Roberta Twp. (G-632), Spooner Twp. (G-637) (*also covers SSM District)	42F3/NW, 42F4/NE/SE, 42F3/SW	192e. Noranda Explor. Co. Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.7832	
Foch Lake Area (G-591), Loken Lake Area (G-597), Roberta Twp. (G-632)	42F3/NW, 42F4/NE/SE, 42F3/SW	192f. Noranda Explor. Co. Ltd.	Au	Assess	Geochem (S), GL, Mag	1985	2.8092	
Gravel Lake Area (G-45), Middle Fox Lake Area (G-85)	42E4/SE, 42D13/NE	192g. Noranda Explor. Co. Ltd. (Cancer Lake Property)	Au, Bm	Assess	GL, VLF, Mag	1984	2.7204	
Haines Twp. (G-662)	52B9/NW	192h. Noranda Explor. Co. Ltd.	Au	Assess	SA	1984	2.8005	
Hilltop Lake Area (M-2874), Mountairy Lake Area (G-743), Sparkling Lake Area (G-764), Harmon Lake Area (G-726)	52G16/NW/SW/SE/NE	192i. Noranda Explor. Co. Ltd.	Au	Assess	A Mag	1984	2.7572	
Killraine Twp. (G-625)	42D14/SW	192j. Noranda Explor. Co. Ltd.	Au, Bm	Assess	DD 1-172.50 m	1984	-	
Killraine Twp. (G-625)	42D14/SW	192k. Noranda Explor. Co. Ltd.	Au, Bm	Assess	DD 1-878.0 m	1985	-	
Lecours Twp. (G-2863)	42D9/NE	192l. Noranda Explor. Co. Ltd. (Devonian Resources)	Au	Assess	DD 2-344.72 m	1985	-	
Lecours Twp. (G-2863)	42D9/NE	192m. Noranda Explor. Co. Ltd. (Tajee Resources) (Intercontinental Energy Resources)	Au	Assess	DD 2-631 m	1985	-	
Lecours Twp. (G-2863)	42D9/NE	192n. Noranda Explor. Co. Ltd.	Au	Assess	DD 2-559 m	1985	-	
Linklater Lake Area (G-69)	52I10/SW	192o. Noranda Explor. Co. Ltd.	Au	Assess	SA, GL	1985	2.8571	
Martinet Lake Area (G-601)	42D16/NW	192p. Noranda Explor. Co. Ltd.	Au, Bm	Assess	Geochem (S)	1984	2.8552	
Pays Plat Lake Area (G-606), Middle Fox Lake Area (G-85)	42D14/NW, 42D13/NE	192q. Noranda Explor. Co. Ltd.	Bm, Au	Assess	GL, EM, Mag	1983	2.7986	
Pic Twp. (G-630), Mussy Lake Area (M-29), Lecours Twp. (G-2863), Rous Lake Area (G-611)	42D9/SE/NE	192r. Noranda Explor. Co. Ltd. (Pryme Energy Resources)	Au	Assess	AEM, VLF	1983	2.8367	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G-630)	42D9/NE	192s. Noranda Explor. Co. Ltd. (Northern Eagle)	Au	Assess	DD 2-1340 m	1984	-	
Priske Twp. (G-631)	42D14/NE	192t. Noranda Explor. Co. Ltd. (Schiralli, Rocco)	Au, Bm	Assess	SA, GL	1984	2.7033	
Priske Twp. (G-631), Lower Aguasabon Lake Area (G-599)	42D14/NE	192u. Noranda Explor. Co. Ltd.	Au, Bm	Assess	VLF, Mag	1984	2.7197	
Priske Twp. (G-631), Pays Plat Lake Area (G-606)	42D14/NW	192v. Noranda Explor. Co. Ltd.	Bm, Au	Assess	Mag	1984	2.7042	
Priske Twp. (G-631)	42D14/SE/SW	192w. Noranda Explor. Co. Ltd. (Schiralli, Rocco)	Au, Bm	Assess	SA	1984	2.7239	
Priske Twp. (G-631)	42D14/SE	192x. Noranda Explor. Co. Ltd. (Schiralli, Rocco) (United Westland Property)	Au, Bm	Assess	VLF, Mag	1984	2.7110	
Priske Twp. (G-631), Pays Plat Lake Area (G-606)	42D14/NW	192y. Noranda Explor. Co. Ltd.	Bm, Au	Assess	GL	1984	2.7025	
Rope Lake Area (G-609)	42E3/SW	192z. Noranda Explor. Co. Ltd.	Au, Bm	Assess	GL	1984	2.7109	
Rope Lake Area (G-609)	42E3/SW	192aa. Noranda Explor. Co. Ltd. (Sandridge Lake Property)	Au, Bm	Assess	Mag	1984	2.7341	
Rope Lake Area (G-609)	42E3/SW	192bb. Noranda Explor. Co. Ltd. (Sandridge Lake Property)	Bm	Assess	HLEM	1984	2.8444	
Rope Lake Area (G-609)	42E3/SW	192cc. Noranda Explor. Co. Ltd. (Sandridge Lake Property)	Bm	Assess	EM	1984	2.8445	
Rope Lake Area (G-609)	42E3/SW	192dd. Noranda Explor. Co. Ltd.	Au, Bm	Assess	SA	1985	2.7883	
Rous Lake Area (G-611)	42D9/NE	192ee. Noranda Explor. Co. Ltd.	Au	Assess	DD 7-2175.5 m	1984/85	-	
Rous Lake Area (G-611)	42D9/NE	192ff. Noranda Explor. Co. Ltd.	Au	Assess	DD 3-875.5 m	1984/85	-	
Seeley Lake Area (G-613)	42D16/SW	192gg. Noranda Explor. Co. Ltd. (Filo, Kevin)	Au	Assess	VLF	1985	2.8179	
Wabikoba Lake Area (G-620)	42C13/SW	192hh. Noranda Explor. Co. Ltd. (Pryme North Energy Joint Venture)	Au	Assess	GL	1984	2.7108	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Loken Lake Area (G-597)	42F4/NE	193a. Noranda Inc. (Geco Division)	Cu, Zn, Ag	Assess	DD 1-298.09 m	1984	-	
Loken Lake Area (G-597)	42F4/NE	193b. Noranda Inc. (Geco Division)	Cu, Zn, Ag	Assess	EM, Mag	1984	2.7639	
Loken Lake Area (G-597)	42F4/NE	193c. Noranda Inc. (Geco Division)	Cu, Zn, Ag	Assess	DD 2-242.01 m	1984	-	
Loken Lake Area (G-597)	42F4/NE	193d. Noranda Inc. (Geco Division)	Cu, Zn, Ag	Assess	DD 8-2774.59 m	1984	-	
Loken Lake Area (G-597)	42F4/NE	193e. Noranda Inc. (Geco Division)	Cu, Zn, Ag	Assess	DD 7-2599.33 m	1984	-	
Loken Lake Area (G-597)	42F4/NE	193f. Noranda Inc. (Geco Division)	Cu, Zn, Ag	Assess	EM, Mag	1984	2.7544	
Manitouwadge Lake Area (G-600)	42F4/NW	193g. Noranda Inc. (Geco Division)	Cu, Zn, Ag	Assess	DD 1-1149.40 m	1982	-	
Loken Lake Area (G-597)	42F4/NE	194. Noranda Mines Ltd.	Cu, Zn, Ag	Assess	DD 3-1059.78 m	1983	-	
Pic Twp. (G-630)	42D9/NE	195. Narex Ore Search Consultants Inc. (Onitap Resources Inc.)	Au	Assess	SA, Geochem (S), GL	1984	2.7618	
Wabikoba Lake Area (G-620)	42C13/SW	196a. Norman Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1983	2.7411	
Wabikoba Lake Area (G-620)	42C13/SW	196b. Norman Resources Ltd. (Pezim, M.) (Clemiss, A.)	Au	Assess	IP, Res	1984	2.7860	
Olie Lake Area (G-605), Flanders Lake Area (G-590), Loken Lake Area (G-597), Foch Lake Area (G-591)	42F5/SW, 42F6/SE, 42F4/NE, 42F3/NW	197. North American Mining Explor.	Au	Assess	AEM, VLF, A Mag	1984	2.7961	
Tyrol Lake Area (G-141)	42E13/SW	198a. Northern Concentrators Ltd.	Au	Assess	STr	1983/84	-	
Pifher Twp./Tyrol Lake Area (G-141)	42E13/SW	198b. Northern Concentrators Ltd. (Cowan, Sol) (Cowan Gold Property)	Au	Assess	DD 6-305.10 m	1985	-	
Pic Twp. (G-630)	42D9/NE	199a. Northern Eagle Mines Ltd. (Pezim, M.) (Clemiss, A.)	Au	Assess	DD 6-1305.76 m	1983	-	
Pic Twp. (G-630)	42D9/NE	199b. Northern Eagle Mines Ltd. (Pezim, M.) (Clemiss, A.)	Au	Assess	Geochem (S), SA, GL	1983	2.6999	
Seeley Lake Area (G-613)	42D16/SW	200. Northern Energy Corp. Ltd. (Jones, David V.)	Au	Assess	VLF	1984	2.7177	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	201. Onitap Resources Inc.	Au	Assess	SA, Geochem (S), GL	1984	2.7722	
Molson Lake Area (G-603)	42C12/NW	202. 502095 Ontario Ltd. (Melrose Resources Ltd.)	Au	Assess	DD 5-824.17 m	1984	-	
Rous Lake Area (G-611)	42D9/NE	203. 508610 Ontario Ltd. (International Cherokee Develop. Ltd.)	Au	Assess	Geochem (S), SA, GL	1984	2.6950	
Pic Twp. (G-630), Mussy Lake Area (M-29)	42D9/SW/ SE	204. 511735 Ontario Ltd. (Walhalla-Maple Leaf Petroleum Ltd.)	Au	Assess	SA	1985	2.8104	
Mussy Lake Area (M-29), Pic Twp. (G-630), Rous Lake Area (G-611)	42D9/SE/ NW/NE	205. 547468 Ontario Ltd. (Shiningtree Gold Resources Inc.)	Au	Assess	AEM, VLF, A Mag	1984	2.6653	
Santoy Lake Area (G-612), Lower Aguasabon Lake Area (G-599)	42D15/NW, 42D14/NE	206. Orequest Consultants Ltd. (Gracey, K. A. - in trust)	Au	Assess	AEM, VLF, A Mag	1983	2.7413	
Rickaby Twp. (G-161)	42E13/SE	207a. Orofino Resources Ltd. (Martin Property)	Au	Assess	GL, VLF	1984	2.7899	
Rickaby Twp. (G-161)	42E13/SE	207b. Orofino Resources Ltd. (Daphne Property)	Au	Assess	Geochem (S), GL, VLF, SA	1984	2.7898	
Rickaby Twp. (G-161)	42E13/SE	207c. Orofino Resources Ltd. (Daphne Lake Property)	Au	Assess	GL, VLF, Mag	1985	2.8398	
Rickaby Twp. (G-161)	42E13/SE, 42E14/SW	207d. Orofino Resources Ltd. (Atigogama Property)	Au	Assess	VLF, Mag	1985	2.8187	
Pic Twp. (G-630)	42D9/NW	208. Pacific Rim Energy Corp. (Pezim, M.)	Au	Assess	Geochem (S), SA, GL	1983	2.6994	
Pic Twp. (G-630)	42D9/NE	209. Padre Resources Ltd. (Gracey, K. A.)	Au	Assess	SA, DD 5-977.76 m	1983	2.6997	
Summers Twp. (G-165)	42E12/SW	210a. Pancontinental Mining (Can.) Ltd.	Au	Assess	STr	1984	-	
Summers Twp. (G-165)	42E12/SW	210b. Pancontinental Mining (Can.) Ltd.	Au	Assess	SA	1984	2.7201	
Armistice Lake Area (G-694), Tib Lake Area (M-2911)	52H5/SW, 52H4/NW	211. Park Avenue Syndicate (Lassila, P. & Lambert, A.)	Au	Assess	GL, EM, Mag	1984	2.7634	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Kabamichigama Lake Area (G-58)	42E4/NE	212. Paterson, Richard	Any	Assess	Man Work	1984	-	
Lorna Lake Area (G-598), Seeley Lake Area (G-613)	42D16/SE/SW	213. Pennant Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1984	2.7096	
Goldie Twp. (G-658)	52A12/NE	214. Peterson, W. (Peterson, T.) (Skalesky, P.)	fel	Assess	Mech Work, Man Work	1984	-	
Irwin Twp. (G-164)	42E12/NW	215. Prago Resources & Energy Inc.	Au	Assess	DD 7-610.51 m, SA	1985	-	
Junior Lake Area (G-57), Toronto Lake Area (G-140)	42L5/NW/SW	216a. Quebec Cobalt & Explor. Ltd.	Au	Assess	Geochem (S), (r), SA, GL	1984	2.7663	
Toronto Lake Area (G-140), Junior Lake Area (G-57), Falcon Lake Area (G-35), Return Lake Area (G-120)	42L5/SW/NW, 52I8/NE/SE	216b. Quebec Cobalt & Explor. Ltd.	Au	Assess	GL	1984	2.7558, 2.7552	
Toronto Lake Area (G-140), Junior Lake Area (G-57), Falcon Lake Area (G-35), Return Lake Area (G-120)	42L5/SW/NW, 52I8/NE/SE	216c. Quebec Cobalt & Explor. Ltd.	Au	Assess	Geochem (S), (r), GL, SA	1985	2.7916	
Toronto Lake Area (G-140)	42L5/SW	216d. Quebec Cobalt & Explor. Ltd.	Au	Assess	Mag	1985	2.8267	
Wabikoba Lake Area (G-620)	42C13/SW	217a. Qued Resources Corp. (Musher Lake Project) (Pezim, M.) (Clemiss, A.)	Au	Assess	IP, Res	1984	2.7252	
Wabikoba Lake Area (G-620)	42C13/SW	217b. Qued Resources Corp. (Pezim, M.) (Clemiss, A.)	Au	Assess	DD 14-2256.82 m	1984	-	
Rous Lake Area (G-611)	42D9/NE	218a. Rabbit Oil & Gas Ltd.	Au	OMEP	PR	1982	63.4198	
Rous Lake Area (G-611)	42D9/NE	218b. Rabbit Oil & Gas Ltd.	Au	OMEP	IP, DD 4-439.85 m	1983	63.4230	
Tyrol Lake Area/ Pifher Twp. (G-141)	42E13/SW	219. Reiter, M.	Au	Assess	STr	1985	-	
Martinet Lake Area (G-601)	42D16/NW	220a. Renner, R.	Au	Assess	Man Work, Mech Work, SA	1984	-	
Seeley Lake Area (G-613)	42D16/SW	220b. Renner, R.	Au	Assess	Man Work, SA	1983	2.7700	
Pic Twp. (G-630)	42D9/NE	221a. Rideau Resources Ltd. (Pezim, M.) (Clemiss, A.)	Au	Assess	Geochem (S), SA, GL	1983	2.6995	
Pic Twp. (G-630)	42D9/NE	221b. Rideau Resources Ltd. (Pezim, M.) (Clemiss, A.)	Au	Assess	DD 3-514.23 m	1985	-	
Strey Twp. (G-633)	42D14/SE	222. Rio Blanco Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1984	2.7079	
Summers Twp. (G-165)	42E12/SW	223. Rivers, V. E.	Au	Assess	STr, Man Work	1984/85	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Oboshkegan Twp. (G-173)	42L4/NE	224. Roach, Stephen W.	Au	Assess	GL	1984	2.8037	
Metcalfe Lake Area (G-84)	42L4/NE	225. Robertson, J. S. (Lafontaine, A.)	Au	Assess	DD 2-246.52 m	1984	-	
Errington Twp. (G-479)	42E11/NE	226a. Roxmark Mines Ltd. (Magnet Mine Property)	Au	OMEP	PR, DD 19-3220.18 m	1980, 1981, 1983, 1984	63.4021	
Errington Twp. (G-479)	42E11/NE	226b. Roxmark Mines Ltd. (Magnet Mine Property)	Au	OMEP	PR, VLF - Map only	1982	63.4022	
Errington Twp. (G-479)	42E11/NE	226c. Roxmark Mines Ltd. (Magnet Mine Property)	Au	OMEP	PR	1982, 1983	63.4228	
Sawbill Bay Area (G-558)	52B14/NW	227a. Sande, David J.	Au	Assess	Man Work, Mech Work	1984	-	
Sawbill Bay Area (G-558)	52B14/NW	227b. Sande, David J.	Au	Assess	Man Work	1984	-	
Burchell Lake Area (G-706)	52B10/SE	228a. Sanders-Lukosius, J.	Au	Assess	GL	1985	2.8355	
Burchell Lake Area (G-706), Moss Twp. (G-676)	52B10/SE	228b. Sanders-Lukosius, J.	Au	Assess	GL	1985	2.8316	
Burchell Lake Area (G-706), Moss Twp. (G-676)	52B10/SE	228c. Sanders-Lukosius, J.	Au, Pt, Pd	Assess	SA	1985	2.8466	
Burchell Lake Area (G-706)	52B10/SE	229a. Sanders, T./ Sanders-Lukosius, J.	Au	Assess	VLF	1985	2.8354	
Burchell Lake Area (G-706)	52B10/SE	229b. Sanders, T.	Au	Assess	GL	1985	2.8317	
Gzowski Twp. (G-182)	42L5/SE	230. Sanfacon, L.	Au	Assess	Man Work	1985	-	
Hay Lake Area (G-728)	52G2/SE	231a. Schoor, M.	Au	Assess	STr, Man Work, Mech Work	1984	-	
Hay Lake Area (G-728)	52G2/SE	231b. Schoor, M.	Au	Assess	Mech Work	1984	-	
Priske Twp. (G-631), Strey Twp. (G-633)	42D14/SE	232. Schreiber Resources Ltd. (Hoiles, Harley H. K.)	Au	Assess	VLF, Mag	1984	2.7366	
Powell Lake Area (G-549)	52B7/NW	233. Shebandowan Resources Ltd.	Au	Assess	SA, Geochem (S), (r), GL	1984	2.7863	
Oboshkegan Twp. (G-173)	42L4/NE	234a. Sherritt Gordon Mines Ltd. (Knappett, R.)	Au	Assess	Mag	1984	2.7310	
Oboshkegan Twp. (G-173)	42L4/NE	234b. Sherritt Gordon Mines Ltd. (Knappett, R.)	Au	Assess	GL	1984	2.8202	
Alfred Lake Area (G-189)	42E15/SW	235a. Shields, S.	Au	Assess	Man Work	1984	-	
Legault Twp. (G-170)	42E11/NW	235b. Shields, S.	Au	Assess	Man Work, Mech Work	1985	-	
Sun Lake Area (G-419)	42E7/NE	236a. Silver, D. M.	Bm	Assess	SA	1984	2.8014	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Sun Lake Area (G-419)	42E7/NE	236b. Silver, D. M.	Bm	Assess	VLF, Mag	1985	2.8248	
Santoy Lake Area (G-612), Tuuri Twp. (G-635)	42D15/NW/ SW	237. Silverhawk Resources Ltd.	Au	Assess	SA, Geochem (S), (r), GL	1985	2.8053	
Priske Twp. (G-631)	42D14/SW	238. Skalesky, P.	Au	Assess	Mech Work	1984	-	
Rous Lake Area (G-611)	42D9/NE	239a. Southern Union Resources Inc.	Au	OMEP	PR	1982	63.4200	
Rous Lake Area (G-611)	42D9/NE	239b. Southern Union Resources Inc.	Au	Assess	SA, Geochem (S), GL	1983	2.6938	
Lower Aguasabon Lake Area (G-599)	42D14/NE	240. Springfield Resources Ltd. (563057 Ontario Ltd.) (Thompson, D.)	Au	Assess	Geochem (S), (r), GL	1984	2.7861	
Keezhik Lake Area (East Arm)(G-288)	52P16/SW	241. Stanford Mines Ltd. (Hamilton, John A.) (Ternowesky, J. E.)	Au	Non-Assess	GL - no map	1984	2.6932	
Schwenger Twp. (G-574), Sabawi Lake Area (G-554)	52B13/SW, 52B14/SW	242. Steep Rock Resources Inc. (White Lake Property)	Au	Assess	DD 3-293.61 m, SA	1982	-	
Walsh Twp. (G-636)	42D15/SE	243. Stenlund, V.		Assess	DD 1-108.81 m	1984	-	
Richardson Lake Area (G-553)	52G3/SE	244. Stewart, Stanley (Coleman, Alton)	Au	Assess	Man Work, Mech Work	1984	-	
Tuuri Twp. (G-635)	42D15/SW	245. Sunrise Metals Corp. (Schiralli, Rocco - in trust)	Au	Assess	AEM, VLF, A Mag	1984	2.7431	
Ashmore Twp. (G-472)	42E10/NW	246. Swerda, Mel	Au	Assess	DD 1-50.59 m	1984	-	
O'Sullivan Lake Area (G-362)	42L6/NE	247. Syngold Explor. Inc.	Au	Assess	Geochem (r), SA, GL	1983	2.6868	
Nesting Lake Area (G-342)	52P10/NE	248. Szetu, S. S. (Keezhik Creek Gold Property)	Au	Assess	Geochem (S), SA	1984	2.7385	
Moss Twp. (G-676)	52B10/SE	249a. Tandem Resources Ltd. (Snodgrass Lake)	Au	OMEP	PR, DD 5-660.50 m, Tr	1983	63.4222	
Rous Lake Area (G-611), Lecours Twp. (G-2863)	42D9/NE	249b. Tandem Resources Ltd./Stanmar Resources Ltd. (LaPrairie, L. F.) (Hawkins, S.)	Au	Assess	GL, Mag, SA, OVD 23-761.51 m	1985	2.8299	
Pic Twp. (G-630)	42D9/NW	250a. Tanglewood Cons. Resources Inc.	Au	Assess	AEM, VLF, A Mag	1983	2.7117	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pic Twp. (G-630)	42D9/SW	250b. Tanglewood Cons. Resources Inc.	Au	Assess	Geochem (S), SA, GL	1983	2.6059	
Frond Lake Area (G-252), Ferguson Lake Area (G-249)	52P9/SW/NW	251a. Tantalum Mining Corp. of Can. Ltd.	Au	Assess	Mag	1984	2.7225	
Frond Lake Area (G-252)	52P9/SW	251b. Tantalum Mining Corp. of Can. Ltd.	Ta, Li	Assess	GL	1985	2.8529	
Frond Lake Area (G-252), Ferguson Lake Area (G-249)	52P9/SW/NW	251c. Tantalum Mining Corp. of Can. Ltd. (Anaconda Can. Explor. Ltd.)	Ta, Li	Assess	Grad, VLF, Mag	1985	2.8298	
Strey Twp. (G-633)	42D14/SE	252. Tally Resources Ltd. (Gracey, K. A.)	Au	Assess	Geochem (S), SA, GL	1984	2.7084	
Metcalfe Lake Area (G-84)	42L4/NE	253a. Teck Explor. Ltd. (Tashota Property)	Au	Assess	DD 4-477.13 m	1984	-	
Pic Twp. (G-630)	42D9/NE	253b. Teck Explor. Ltd. (Hardy Int.'l Develop. Inc.)	Au	Assess	DD 3-944.3 m	1985	-	
Seeley Lake Area (G-613)	42D16/SW	254. Teeshin Resources Ltd. (Nelson, Joyce)	Au	Assess	VLF, Mag	1984	2.7224	
McComber Twp. (G-166)	42E12/NW	255. Tenacity Mining Corp. Ltd. (Ralph Lake Property)	Au	Assess	Geochem, SA, GL	1983	2.6900	
Burchell Lake Area (G-706)	52B10/SE	256a. Tenajon Silver Corp. (MacLeod, J. W.)	Au	Assess	DD 1-221.90 m	1984	-	
Burchell Lake Area (G-706)	52B10/SE	256b. Tenajon Silver Corp. (MacLeod, J. W.)	Au	Assess	SA	1985	2.7740	
Tuuri Twp. (G-635), Walsh Twp. (G-636)	42D15/SW/SE	257. Ternowesky, J. (Skalesky, P.)(Baarts, A.)(Hibbart, N.)	Au	Assess	PR	1984	2.6931	
Santoy Lake Area (G-612)	42D15/NW	258. Terrace Bay Resources Ltd.	Au	Assess	Geochem (S), (r), SA, GL	1984	2.7963	
Croll Twp. (G-491)	42E10/NW	259a. Theriault, O.	Au	Assess	DD 2-76.50 m	1984	-	
Croll Twp. (G-491)	42E10/NW	259b. Theriault, O.	Au	Assess	STr, Man Work, Mech Work	1984	-	
Errington Twp. (G-479)	42E11/NE	259c. Theriault, O (Culhane, P.)	Au	Assess	STr	1984	-	
Castlewood Lake Area (G-22)	42E13/NE	260a. Thorco Gold Finders Inc. (Thorsteinson, D.) (Cox, N.)	Au	Assess	Grad	1985	2.8019	
Summers Twp. (G-165), Beardmore Area (G-7)	42E12/SW	260b. Thorco Gold Finders Inc. (Thorsteinson, D.)	Au	Assess	GL, Mag	1984	2.8379	
Castlewood Lake Area (G-22)	42E13/NE	261a. Thorsteinson, David	Au	Assess	STr	1985	-	
Castlewood Lake Area (G-22)	42E13/NE	261b. Thorsteinson, David (Cox, Nolan)	Pb, Zn, Cu, Ag, Au	Assess	STr	1985	-	
Summers Twp. (G-165)	42E12/SW	261c. Thorsteinson, David	Au	Assess	STr	1985	-	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Santoy Lake Area (G-612), Tuuri Twp. (G-635)	42D15/SW	262. Thrust Resources Ltd. (Tecumseh Resources Ltd.)	Au	Assess	Geochem (S), (r), GL, SA	1985	2.8378	
Klotz Lake Area (G-295)	42F13/SW	263. Transway Explor. Inc.	Au	Assess	VLF, Mag	1984	2.7323	
Cockeram Twp. (G-184)	52H2/SE	264a. Tri-Ven Mineral Corp.	Marl	Assess	Man Work	1984	-	
Cockeram Twp. (G-184)	52H2/SE	264b. Tri-Ven Mineral Corp.	Marl	Assess	Mech Work	1985	-	
Rous Lake Area (G-611)	42D9/NE	265. Triple Crown Resources Ltd.	Au	OMEP	PR	1982	63.4227	
Lower Aguasabon Lake Area (G-599)	42D14/NE	266. Troy Minerals & Technology Inc. (563058 Ontario Ltd.)	Au	Assess	Geochem (S), (r), SA, GL	1984	2.7862	
Wabikoba Lake Area (G-620), White Lake (South) Area (G-623)	42C13/SW/ SE	267a. Tylox Resource Corp. (Manwa Explor. Services Ltd.)	Au	Assess	IP, Res	1983	2.6589	
Wabikoba Lake Area/ Molson Lake Area (G-620)	42C13/SW, 42C12/NW	267b. Tylox Resource Corp. (Homestake Mineral Develop. Co.)	Au	Assess	Geochem (S), SA	1983	2.7400	
Wabikoba Lake Area/ Molson Lake Area (G-620)	42C13/SW, 42C12/NW	267c. Tylox Resource Corp. (Homestake Mineral Develop. Co.)	Au	Assess	IP, Res	1984	2.7234	
Molson Lake Area/ Wabikoba Lake Area (G-620)	42C12/NW	268. Twin Eagle Resources Inc. (Eagle River Mines Ltd.) (Berle Oil Corp.)	Au	Assess	GL	1983/85	2.8356	
Lower Aguasabon Lake Area (G-599), Strey Twp. (G-633)	42D14/NE/ SE	269a. Vulcan Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1984	2.7076	
Wabikoba Lake Area (G-620)	42C13/SW	269b. Vulcan Resources Ltd.	Au	Assess	SA, Geochem (S)	1983	2.6365	
Wabikoba Lake Area (G-620)	42C13/SW	269c. Vulcan Resources Ltd.	Au	Assess	AEM, VLF, A Mag	1983	2.7628	
Burchell Lake Area (G-706)	52B10/SE	270a. Wawaig Resources Inc. (Spence, W. I.) (Morehouse, W. D.)	Au	Assess	VLF, Mag	1984	2.7380	
Moss Twp. (G-676)	52B10/SW	270b. Wawaig Resources Inc. (Kennco Explors. (Can.) Ltd.)	Au	Assess	VLF, Mag	1985	2.8345	

TABLE 4.1 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Rous Lake Area/ Lecours Twp. (G-611), Pic Twp. (G-630)	42D9/NE	271. Wayfair Explor. Ltd. (Wayfair #1 & #2 Properties) (Filo, K., et al)	Au	Assess	GL	1984	2.7344	
Springer Lake Area (G-413), Bartman Lake Area (G-202)	43D5/NE, 43D12/SE	272a. Weaco Resources Ltd. (Lansdowne House Project)	Au, Cu, Ni, Pt, Pd	Assess	VLF, Mag	1985	2.8297	
Springer Lake Area (G-413)	43D5/NE	272b. Weaco Resources Ltd.	Au	Assess	DD 1-220.67 m	1985	-	
Priske Twp. (G-631)	42D14/SE	273. Westfield Minerals Ltd. (Little Bruin Lake Property)	Au	OMEP	BTS, Geochem (S), (r), GL, VLF, Mag	1981	63.4034	
Pic Twp. (G-630)	42D9/NW	274. Wildcat Petroleum Ltd.	Au	Assess	Geochem (S), SA, GL	1983	2.6996	
Tuuri Twp. (G-635), Walsh Twp. (G-636)	42D15/SW/ SE	275. Wildrose Petroleum Ltd. (Orequest Consultants Ltd.)	Au, Bm	Assess	AEM, VLF, A Mag	1984	2.7412	
Finlayson Lake Area (G-528)	52B13/NE	276. Willy, Allan (Krehm, W. - in trust)	Au	Assess	SA, Geochem (r), Photo	1983	2.7024	
Powell Lake Area (G-549)	52B7/NW	277. Wolf River Resources Ltd.	Au	Assess	Geochem (S), SA, GL	1984	2.7959	
Duckworth Twp. (G-638)	52B9/SE	278. Woynarski, John (Penziwol Gold-Silver Property)	Au	Assess	SA, GL	1983	2.6548	
Rous Lake Area (G-611)	42D9/NE	279. Youngman Oil & Gas Ltd. (Opsal, F.)	Au	OMEP	PR	1983	63.4197	
Mussy Lake Area (M-29) (*SSM District claims)	42D9/SE	280. Zone Petroleum Corp.	Au	Assess	SA, DD 6-872.64 m	1984	-	

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 4.2

Number on Figure	Individual or Company	Activity
	Acker, W.	Stripping, trenching and bulk sampling, Hays Lake Mine
	Atlantic Mining Corporation	Bulk sampling, stripping, trenching, diamond drilling on Sand River Mine, Eva Township
	Corporation Falconbridge Copper	Diamond drilling and exploration in the Winston Lake Area
	Corporation Falconbridge Nickel	Line cutting, stripping, trenching, geochemical sampling, geological mapping and geophysics on the Hammond Reef Mine, Marmion Lake
	Fern Elizabeth Gold Explorations Limited	Drilling on Elizabeth Gold Mine, Atikokan Area
	Giant Gripp Mines Incorporated	Diamond drilling at Marshall Lake
	Interquest Resources Incorporated	Line cutting, geological mapping, geochemical sampling and geophysics on the J. J. Walsh claims on the north shore of Sapawe Lake in Hutchinson Township; drilling
	Johnson, E.	Several dumps bulldozed open, Keystone Silver Mine, O'Connor Township
	Lac Minerals Limited (William's Property, Hemlo)	Stripping, diamond drilling, shaft sinking, open pit
	Lincoln Resources	Geological mapping, linecutting, stripping, trenching, sampling, geophysical and geochemical surveys on the Morley Property
	Lytton Minerals Limited (Ontario Paper Company Option)	Line cutting, geophysics, geochemistry, geology, drilling
	Metalore Resources Limited	Diamond drilling in Irwin Township
	Micham Exploration	Exploration in Syine Township
	Muscocho Explorations Limited	Diamond drilling and stripping at Tashota-Nipigon Mine
	Noranda Mines Limited (Hemlo Golden Giant Property)	Diamond drilling, shaft sinking, stripping
	Pat Mikko Resources Limited	Stripping, trenching, mining, mill construction on-site, Johnston-McKenna Property
	Phoenix Gold Mines Limited	Geology, geochemistry, sampling, trenching, stripping and diamond drilling on the Quebec-Sturgeon River Mine Property, Irwin, Elmhirst, Walters and Pifher Townships
	Reiter, M. (Green, J. J.)	Stripping, trenching and sampling on Four-claim Property, Irwin Township
	Teck Corporation (Hemlo Corona Property)	Diamond drilling, shaft sinking, stripping
	Teck Corporation	Milling of dump material from Leitch Gold Mine, Eva Township (January 1985)

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

TABLE 4.3

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1975	3,436	2,869	6,404	38,652	53,020	4,700	105,338
1976	2,364	3,552	6,079	52,551.6	29,504	4,600	101,025.8
1977	1,964	2,966	5,077	24,879	25,601	4,870	68,727
1978	3,517	1,982	6,612	20,182	20,589	6,206	51,299
1979	3,099	2,139	7,554	11,528	69,612	14,727	101,799
1980	5,527	1,836	11,245	53,418	57,483	5,372	127,288
1981	6,768	4,162	13,851	55,256	172,366	13,863	256,686
1982	10,266	4,613	19,349	133,035	114,805	24,437	292,273
1983	15,835	1,537	33,547	113,554.3	439,992.8	64,789.1	664,891.3
1984	8,389	7,206	34,904	142,488.6	551,863.9	90,107.6	922,977.6
1985 (to end of Nov.)	3,953	10,178	28,679	165,506.8	465,765.7	59,262.1	766,655.9

discovered the Thunder Bay Silver Mine near the present day site of the Terry Fox Lookout, just east of Thunder Bay. P. McKellar petitioned the Provincial Government to change the Royalty Law, replacing it with an acreage tax. This change forced the Montreal Mining Company into exploring its vast holdings. In 1868, G. Brown of the Montreal Mining Company discovered silver on a small island in Lake Superior. The property was sold to the Silver Islet Mining Company. After overcoming severe engineering problems, production commenced and continued until 1883.

During this period (1870 to 1880), a number of mines and properties were developed in the area. Among these are the Shuniah Mine, Rabbit Mountain Mine, Porcupine Mine, Badger Mine, East End Silver Mountain Mine, and the West End Silver Mountain Mine. In the 1890s, the price of silver declined sharply from 104.6 in 1890 to 58.26 in 1898 (in current U.S. cents, Mohide 1985) causing all of the mines to close down. A number of attempts were made to reopen the mines but these failed. The total production figures are very sketchy, but it is estimated at 4.7 million ounces of silver (Sergiades 1968).

GENERAL OBSERVATIONS ON SILVER VEINS IN THE THUNDER BAY AREA

1. As noted by Franklin (1981), most of the silver came from veins hosted by the Rove Formation. The relationship appears to be even more restricted. The Rove Formation has three major units: 1) Black pyritic shale and argillite; 2) interbedded argillite and greywacke; and 3) quartzitic greywacke. All major silver producing veins are associated with the black pyritic shale and argillite unit. According to Franklin (1981), this unit of the Rove Formation is metal rich and graphitic. Non-producing carbonate-quartz veins, mineralogically similar to producing veins, cut all rock types in the area including Osler Group volcanic rocks, porphyry intrusions, and Duluth-type gabbro intrusions.
2. The producing silver veins are located within 30 m of diabase dikes or sills. The host Rove Formation rarely exceeds 100 m in thickness, and therefore is in close proximity to the sills and crosscutting dikes. The clearest relationship between the producing part of the vein and a dike is found at the Silver Islet Mine. Production was closely confined to the vein as it cuts the dike.
3. The veins occupy fault structures which commonly show offsets of 50 m or more between diabase sills and sediments. The veins are usually composite. In the Silver Mountain area, early carbonate veins are brecciated and refilled by fluorite, quartz, and sulphide mineralization. In some cases, these veins may be rebrecciated and filled by a barite-dominated vein filling.
4. On a number of properties in the Silver Mountain Area, mineralization occurs at or near the intersection of two vertical dipping veins striking 60° and 90°.
5. The mineralogy of the veins is generally simple, consisting of acanthite, native silver, galena, sphalerite, chalcopyrite (typically altered to chalcocite and malachite), pyrite, barite, fluorite, calcite, and quartz. Acanthite often forms a thin film on fractures in the vein or wall rock and dendritic pods after native silver. Native silver is commonly associated with dark brown sphalerite and purple fluorite. In non-silver bearing sections of the vein, the fluorite is typically green and the sphalerite is honey yellow in colour.

   The veins are vuggy and consist of coarse carbonate, white to pale amethystine quartz, green colliform fluorite, and coarse bladed barite. Galena commonly occurs as skeletal crystals. Cobalt-nickel arsenides have been reported at Silver Islet, Edward Island, and the 3A Mine. Graphite is present at the Silver Islet and Edward Island locations.

PROPERTY DESCRIPTIONS

PORCUPINE MINE

The Porcupine, also known as the Twin City Mine or Creswell Property, is located in the northeastern corner of Gillies Township, in the central part of patented mining claim 96T. The mine is accessed by a series of four adits and two shafts. Production, combined with that of the neighbouring Badger Mine, was 600 000 ounces silver. An attempt to reactivate the mine in the late 1960s failed. In a consultant's report, a small block of ore 20 feet by 20 feet by 3 feet (6.1 m by 6.1 m by 0.9 m) averaging 394.5 ounces silver per ton, or a total of 40 000 ounces silver, was outlined (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

The silver-bearing vein strikes 60° and dips 90°. The vein is hosted by diabase and Rove Formation shale and occupies a fault that has offset the Rove-diabase contact by 10 m. The vein is 3 m wide below the diabase and 30 cm wide in the diabase. Franklin (1970) cited slickensides in the vein carbonate as evidence for post vein formation movement. Mineralized samples collected in the 1960s (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay) consist of coarse white calcite (individual crystals are up to 10 cm) with vuggy sections containing smokey to amethystine quartz. Fragments of Rove formation shale are often rimmed by a thin rind of white quartz and colloform green to purple fluorite. The most common sulphide mineralization is dark brown to honey yellow sphalerite. Acanthite occurs as a coating on fractures and cleavage planes in the calcite and more rarely as crystals on quartz crystals. Native silver occurs along fractures and as dendritic masses. Other sulphide mineralization present includes galena, chalcopyrite, and pyrite.

KEYSTONE MINE

The Keystone or Climax Mine is located in the central part of surveyed mining claim 145T, O'Connor Township. The property is underlain by Rove Formation shales and diabase. At least three veins have been exposed by a series of trenches and shafts. The number six vein is exposed in an open cut, 1 to 3 m deep, 2 m wide, and 50 m long. There are at least two generations of parallel veins. The main vein is 50 to 150 cm wide and consists of coarse carbonate, green fluorite, white quartz, sphalerite, galena, and minor pyrite. Acanthite was observed in dump material. A set of vuggy amethystine quartz veins 3 to 10 cm wide parallel the main vein on the south side. The main vein is bounded by diabase on the north side and Rove Formation shale on the south. An attempt was made by E. Johnson of Thunder Bay in 1985, to re-evaluate a number of muck piles on the property. Several dumps were bulldozed open and a number of two-ton bags of high grade material were collected. The samples consisted of quartz-carbonate with green to purple fluorite, honey yellow to black sphalerite, pyrite, native silver, and acanthite. Samples containing acanthite ran over 50 ounces per ton while those with native silver ran over 100 ounces per ton.

SILVER MOUNTAIN AREA

The Silver Mountain area consists of two properties, the East End and West End Silver Mountain Mines. These properties are located on lots 10, 11, 12, concession II, in Lybster Township, approximately 56 km southwest of Thunder Bay. In 1903, it was estimated that West End and East End Silver Mountain Mines had produced $450 000 and $50 000 worth of silver, respectively (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). A large vein, ranging from 1 to 10 m in width (with an average of 2 m), has been traced for 500 m across the two former producers. The vein occupies a fault at the contact between diabase to the north and Rove Formation shales to the south. Stoping was confined to 15 m of the shale-diabase contact. Production was associated with a series of calcite stringers on the north side of the vein (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

At the number one shaft, caving exposes the main carbonate vein cutting two smaller vein sets; a barren quartz-carbonate set strikes at 100° and dips 90° and a sulphide-rich vein 20 cm wide strikes at 50° and dips 90°. The stope is developed where the veins intersect.

At the number two shaft, a stope has collapsed exposing unmined parts of the main vein. From north to south, the main vein consists of 15 cm of coarse bladed barite, 30 cm of coarse white calcite, 60 cm of layered quartz-carbonate, 90 cm that has been mined out, andor more. Of these 13, to more than four ounces and of the latter 9, go more than five ounces. 7 contain more than six ounces while two go over 20 ounces and none go over 32 ounces. The average assay for all 425 samples is 0.85 ounces.

Diamond drilling in 1947 to 1955 indicated 60 000 tons of 5.0 ounces per ton silver and 12% fluorite (Mineral Bulletin MR198, Energy Mines and Resources Canada, 1983).

ST. IGNACE ISLAND COPPER-SILVER OCCURRENCE

The St. Ignace Island Occurrence, also called the Harrison Location or Horlac Mines Limited property, is located just north of Finch Point on the northeastern corner of St. Ignace Island in Lake Superior. Two parallel veins, 10 to 20 cm in width, hosted by Osler Group volcanic rocks are exposed in a series of trenches and pits. The Silver Islet Mining Company did the initial work on the property during the 1860s (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). Drilling by Horlac Mines Limited in 1955 encountered quartz-carbonate veins containing chalcocite and native silver. The vertical dipping veins strike 90° but unlike other similar occurrences, there appear to be no associated diabase dikes or sills.

CURRENT RIVER AGATE OCCURRENCE

The property is located in Mining Location 8, MacGregor Township, just west of the Spruce River Road and north of Highway 17.

The area was mapped by the Ontario Geological Survey in 1951 by Moorhouse (1960, Map No. 1960o), and is underlain by Gunflint Formation (carbonates and cherts) and Rove Formation (shales) which have been intruded by Logan diabase sills. Moorhouse (1960) showed a fault trending 65° that forms a contact between the sediments and diabase.

On the property, a diabase sill forms the cap to a steep-sided hill which trends at 65° from the Terry Fox monument to the Spruce River Road. The agate occurs at the base of the hill within Rove Formation shales and Gunflint Formation carbonates.

The agate forms in stalactitic masses 4 to 8 cm across by 30 cm long in a fine-grained chalky matrix. The colour varies from white to pale orange to grey. The coloured bands form a circular pattern, with individual layers ranging from 1 to 3 mm in width.

The exposed area of agate is 6 m by 9 m with agate forming a conformable layer (50% to 70% agate up to 1 m thick). Agate floats could be observed up to 100 m east of this exposure in talus. Minor pyrite and black fine-grained sulphide mineralization occurs in the agate.

This occurrence appears to be the strike extension of the Current River agate exposed in the first outcrop east of the Terry Fox Lookout. Here, small lenses of agate (20 cm by 10 cm) and sulphide mineralization occur in the upper fragmental carbonate unit of the Gunflint Formation near the contact with the Rove Formation shales.

The agate may have been formed from solutions, heated by diabase, encountering the carbonates.

Samples of agate cut by B. Haywood, Thunder Bay Lapidary Club, take a high polish. Mounted samples are attractive and should be easily marketed. The generally quality and nature of the agate is similar to "Mexican Lace Agate" or "Crazy Lace Agate".

HEMLO AREA

Currently, three companies, Noranda Incorporated, Teck Corporation, and Lac Minerals Limited, have brought their Hemlo properties into production. Noranda Incorporated initiated production in March of 1985 at the rate of 750 tonnes per day. Production is estimated at 92 000 ounces gold for 1985 (The Northern Miner, December 9, 1985). Teck Corporation's

Teck-Corona Mine officially opened in September 1985. The mill, rated at 1000 tonnes per day, was expected to produce 54 075 ounces gold in 1985 (The Northern Miner, September 16, 1985). Lac Minerals Limited began producing from their open pit on October 21, 1985 (The Northern Miner, October 28, 1985).

Exploration activity in the Hemlo area, from Marathon to White River, has remained very high. The majority of companies have filed sufficient assessment work to hold ground for a number of years.

Geological Data Inventory Folios (GDIFs) have been prepared for the area. The general geology of the main Hemlo deposit has been summarized in a field trip guidebook (Patterson 1984).

LYTTON MINERALS LIMITED PROPERTY

(including the former Bowhill Gold Mines Property and the Heron Bay Gold Mine Property also called Peekongay Property)

The property, located in Pic Township, is centred around the town of Heron Bay, and stretches from Lake Superior to the Pic River.

The area is underlain by felsic metavolcanics (breccia to tuffs) and mafic metavolcanics which have been intruded by granitic rocks, diabase dikes, and lamprophyre dikes. The felsic metavolcanics are a part of the Heron Bay series (Muir 1982).

A large scale M-shaped fold, approximately 2 km across, occurs to the south of the Lytton property and is defined by folded foliation (visible on 1 inch to 1/2 mile airphotos). A strong east-west lineament occurs just to the north of the town of Heron Bay.

Hartwick *et al.* (1985) described the geology of the property as follows:

> The volcanic succession, which underlies the Peekongay Property, forms part of the Heron Bay Group and is approximately 2 miles (3.2 km) thick on the property. These rocks can be subdivided into three major sequences:
>
> (1) A northern sequence of mafic to intermediate, locally pillowed flows and lesser pyroclastic rocks approximately 3,600 feet (1,100 m) thick. A significant proportion of the mafic to intermediate flows are pervasively silicified giving the outcrops a more "felsic" appearance.
>
> (2) A central zone about 2,000 feet (600 m) thick comprising a complex succession of interbedded fine to coarse-grained pyroclastics of intermediate composition with local interbedded volcaniclastic horizons. The "C" Zone occurs near the southern edge of the central zone.
>
> (3) A southern sequence of coarse, felsic to intermediate pyroclastics about 5,000 feet (1,500 m) thick. A trend to a more felsic composition, as well as a general coarsening of clast size, appears to occur southwards.

As summarized from Hartwick *et al.* (1985), four major environments of gold mineralization occur on the property:

1. Pyritic quartz-rich molybdenite-bearing possibly stratiform unit in mafic to intermediate tuffs ("C" Zone).
2. Vuggy, pyritic quartz-carbonate veins and stringers cutting a possible subvolcanic quartz-feldspar porphyry sill ("Porphyry" Zone).
3. Pyritic, silicified, and quartz-sericite altered, dacitic pyroclastic rocks and, to a lesser extent, mafic to intermediate tuffs (Main Zone, eastern part of North Zone).
4. Quartz-carbonate veins and vein breccias with variable amounts of pyrite, chalcopyrite, galena, sphalerite, and tourmaline (Bowhill trench, 1872 shaft area trench, western part of North Zone).

Ore grade intersections over significant widths (i.e. 6 feet (2 m) or greater) have been obtained from the "C" and "Porphyry" Zones. In contrast, the silicified and quartz-sericite altered pyroclastic rocks, of which the Main Zone is the most prominent, are characterized by geochemically anomalous gold values in the order of 100 to 200 ppb with local highs up to 0.11 ounce gold per ton over 3.1 feet (0.95 m), but no ore grade intersections have been obtained (Hartwick *et al.* 1985).

Quartz-carbonate veins and vein breccia occur in essentially all lithologies and, although there are several occurrences of these veins which carry gold values >0.40 ounce gold per ton, they are very erratic and discontinuous. The lateral and vertical continuity of the high grade intersections is very limited.

Porphyry Zone

Further detailed work by Derry, Michener, Booth and Wahl identified a mylonite zone on the north side of a porphyry intrusion 1 km west of Heron Bay. This unit was previously called a thinly bedded hematitic ash tuff marker (B. Pearson, Geological Consultant, Derry, Michener, Booth and Wahl, Toronto, personal communication, 1985).

The unit is highly foliated and locally folded. It is comprised of fine-grained, red (hematitic) thinly laminated chlorite and felsic layers. In drill core, the mylonite grades southward into a sheared and deformed feldspar porphyry. The porphyry contains 10% white quartz veins from 1 to 5 cm wide with minor pyrite and 3% to 5% black tourmaline. A value of 0.19 ounce gold per ton across 23.5 feet has been intersected within the porphyry, near the hanging wall (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

C-Zone Mineralization

The C-Zone mineralization occurs at or near the footwall of the feldspar porphyry. Mineralization consists of layers and lenses of quartz up to 1 cm thick in a chlorite schist (possibly a sheared mafic metavolcanic). The quartz-rich layers contain molybdenite. Pyrite (50% to 10%) occurs as 1 to 3 mm cubes which have been deformed and possibly rotated in foliation. The zone appears to crosscut the mafic metavolcanics and the feldspar porphyry. Late quartz-carbonate veins cut the foliation in the zone. Most of the rocks north of the railway tracks consist of heavily carbonated mafic metavolcanics which have a felsic appearance. The best diamond drill intersection obtained was 17.0 feet of 0.19 ounce gold per ton (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

Main Zone Mineralization

The zone consists of a series of sericite schist units within felsic metavolcanics that trend at 60° across the property. In the moderately foliated sericite schist, 5% to 10% blue quartz-eyes, and up to 2 mm in size, occur. The quartz-eyes are deformed parallel to foliation. In the most strongly foliated sections, quartz-eyes are absent and the narrow quartz-rich layers (<2 mm) contain molybdenite. Drilling and surface exploration has defined five parallel units. A number of occurrences are known on the zone. The best intersection reported was 4.83 ounces gold per ton across 1.0 foot (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

a) Bowhill Mines Trench: Described by Hartwick *et al.* (1985), this trench is a section of the Main Zone (located about 1 km west of Heron Bay):

> This trench, excavated by Bowhill Mines in the middle 1930's, is about 200 feet (60 m) long by 30 feet (9 m) deep and 10 feet (3 m) wide. The trench is largely caved in but the pyritic quartz-sericite schist unit is exposed at the end of the carbonate-quartz vein which contains sphalerite, galena and pyrite; a bulk sample of 500 lbs; taken presumably from this vein material by Bowhill Mines, assayed 0.3 oz Au/ton and 1.5 oz Ag/ton.

Drilling and geochemical work by Lytton Minerals Limited (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay) shows the Main Zone to be Na depleted and K, Mo, Au, Zn, Cu enriched. The Main Zone and the carbonate vein are cut by a lamprophyre dike. The carbonate veins contains black tourmaline and molybdenite.

Stripping on the main zone west of the Bowhill Mines occurrence (1100 m west of Highway 627 and the Canadian Pacific Railway) exposes a shear zone which shows evidence of progressive deformation. The earliest phase, largely ductile, during which volcanic fragments within a felsic pyroclastic were being folded and stretched parallel to foliation, was followed by an event in which discrete sericite schist zones, 20 to 100 cm wide and heavily carbonated, cut across the ductile shear. Carbonate pods within the sericite schist are deformed. During this event, a mafic dike, 30 to 60 cm wide, containing fragments of sericite schist, intruded into the sericite schist. This dike is folded as it crosses the sericitic schist zone. The final phase appears to have been brittle deformation, with the formation of quartz-tourmaline veins along the margin of the mafic dike and in the carbonate pods.

b) Heron Bay Gold Mine: Hartwick *et al.* (1985) described the property as follows:

> This last outcrop stop is the site of the early workings described by Bell. Two shafts are present, one shallow shaft, probably about 8 m deep in the eastern part of the trenched area, and the second shaft, which is about 16 m deep, in the central part of the trenched area. These two shafts are about 40 m apart. Within this trench you will see that the main target has been a carbonate-quartz vein which strikes west-northwesterly. This vein occurs along a fault which cuts the volcanic stratigraphy. The quartz vein carries sporadic gold values; the best result from our sampling is 0.314 oz Au/ton over 0.9 m. The pyritic quartz-sericite unit is located about 25 m south of the trench but is not exposed.

The vein carries black tourmaline, molybdenite, galena, pyrite, and minor chalcopyrite. Barite has been identified by X-ray diffraction (Geoscience Laboratories, Ontario Geological Survey, Toronto). The felsic metavolcanics are foliated at 65°, dipping 50°N and the fragments are lineated at 45°W. The veins strike 95°, dip vertically, and crosscut the metamorphic foliation.

South Zone: A sericitic zone, similar to the main zone occurs approximately 100 m south of the Heron Bay Gold Mine. Stripping and trenching has exposed quartz-carbonate veins within a sheared volcanic breccia. The veins contain chalcopyrite, galena, pyrite, and tourmaline.

QUED RESOURCES CORPORATION

The property is located approximately 48 km northeast of Marathon and 3 km north of Solong Lake.

Siragusa (1984) mapped the area for the Ontario Geological Survey. The property is underlain predominantly by mafic metavolcanics, commonly pillowed with south-facing tops. A narrow unit of felsic metavolcanics is exposed in the southwestern part of the property. The regional trend of the units is 125°, dipping 70°S.

Geochemistry (Au, Zn, Cu) and IP have outlined three anomalous zones trending at 125° across the property. These zones were tested by trenching and diamond drilling. The pattern of trenching consists of a "Main" north-south trench (QTIA), 70 m by 800 m long through claims TB774250 and TB774251 and a series of smaller trenches made along the strike of the anomalous zones on claims TB774249 and TB774255.

Zone A

Zone A occurs in the main trench near the contact between a quartz-feldspar porphyry and mafic metavolcanics. The feldspar phenocrysts in the porphyry have been deformed, and the porphyry has been altered to a sericite schist. The mafic metavolcanics are chlorite schists with pyrite phenocrysts up to 3 mm (10% of the unit). The porphyry contains inclusions of mafic metavolcanics and appears to be intrusive.

Zone B

In the main trench (approximately the centre of claim TB774251), a series of quartz veins occur in a chlorite schist. Pyrite occurs as porphyroblasts up to 2 mm in size adjacent to the vein and 10 cm into the schist.

Zone C

A highly deformed zone of chert-pyrite-magnetite ironstone is located at the north end of the main trench and in several of the smaller trenches. The ironstone has been intruded by feldspar porphyries (now deformed and silicified). The associated mafic metavolcanics are south facing (pillows stretched 2:1) and appear less deformed. Values of up to 0.081 ounce gold per ton across 5 m have been reported for the zone (QUED News Release, February 27, 1984). Drilling encountered a number of anomalous zones (100 ppb), the highest of which returned 1785 ppb gold across one metre.

In trench QT3, approximately 100 m west of the north end of the main trench, visible gold was noted in a folded quartz vein hosted in mafic metavolcanics (J. Dumouchel, Geologist, Ore Quest Limited, Vancouver, personal communication, 1985).

CHAVIN OF CANADA LIMITED

The property is located approximately 40 km northeast of Marathon, between Dead Otter Lake and Highway 614. The area was mapped by Siragusa (1984) for the Ontario Geological Survey. The eastern part of the property is underlain by mafic metavolcanics which have been intruded by a granitic body centred on Dotted Lake. The granitic rocks on the shore of Dotted Lake, near the end of the access road, consist of 20% quartz, 40% plagioclase, 25% potassium feldspar, and 20% biotite. They are medium grained, well foliated (striking 170° and dipping 70°W), and are cut by numerous quartz veins.

The geology of the property is exposed in two trenches:

1. Approximately 100 m west of Dotted Lake, south of the access road, a trench, 10 m by 20 m by 1 m, exposes a shear zone (amphibole schist) cutting amphibolites (mafic metavolcanics). The amphibole schist is up to 1 m wide, fine grained, well foliated (striking 110° and dipping 90°) with chlorite-rich layers containing up to 2% pyrrhotite. A white, glassy quartz vein, 20 to 30 cm wide occurs parallel to foliation within the amphibole schist. Only minor pyrrhotite was noted in the quartz vein. The amphibolite host rock is green in colour, weakly foliated (striking 160° and dipping 70°W) and consists of 60% amphibole and 40% plagioclase and minor epidote pods. Assays of the quartz vein and the amphibolite schist returned <0.01 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).
2. 400 m west of Dotted Lake on the south side of the access road, a trench and stripped area, 900 m by 10 m by 5 m, exposes a shear zone (amphibole-chlorite schist) up to 4 m wide cutting pillowed mafic metavolcanics. The schist contains a number of sugary white quartz veins ranging from 30 to 100 cm in width, which have been partly deformed. The veins contain pyrite, molybdenite, chalcopyrite, and chloritic pods. The vein and the schist trend at 160°, dipping 70°W. A number of narrow (10 cm) feldspar porphyry dikes intrude the amphibole schist parallel to foliation. The host rock is a pillowed mafic metavolcanic in which the pillows are stretched 2:1. Alteration of the pillows has produced dark rims, 20 to 40 cm in width, and a bleached core. A Logan type diabase dike, 2 m wide, and trending north-south cuts the amphibole schist 20 m south of the road. Assays of up to 3000 ppb gold and 1000 ppm Mo have been reported (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

OTHER PROPERTIES

1. The Bel Air Resources Property is located 4 km west of the Teck-Corona Hemlo Mine. Westfield Minerals Limited has carried out a program of geological mapping, geophysics, geochemistry, trenching, and drilling. The general stratigraphy from north to south (based on Westfield Minerals Limited data), consists of felsic metasediments (including a westward extension of the "Highway Zone" of Golden Sceptre), mafic metavolcanics, the Hemlo Fault Zone, metasediments (calc-silicates, siltstone, and pelites), volcanoclastics, and metasediments. Trenching has exposed pyritic sericite schists with green mica. The Hemlo Fault appears to gently crosscut the stratigraphy, and is terminated at the Rous Lake Pluton.
2. The Knut Kuhner Showing is located 1 km south of Page Lake, 10 km northeast of the Marathon airport on the property of Gowganda Resources Incorporated. The main showing was stripped and trenched by Kerr Addison Mines Limited in 1970. The occurrence consists of felsic metavolcanics, chert, and graphitic schists. Sulphide-rich units, containing pyrite and pyrrhotite, are associated with the chert. Assays of grab samples returned up to 3450 ppb gold and 0.73% zinc (Geoscience Laboratories, Ontario Geological Survey, Toronto).
3. Esso Resources Canada Limited reported the results of drilling on their ground east of Heron Bay. The property is apparently on strike with Lytton Resources' Main Zone. Hole No. 1 encountered an intermediate to feldspathic crystal tuff and lapilli-tuff containing contorted foliation and brecciated quartz veins, with pink calcite, pyrite, and molybdenite. Assays by Esso Resources Canada Limited returned up to 1300 ppb gold and 280 ppm molybdenum across 0.6 m (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).
4. The Hardy International Development property is located approximately 3 km east of the Esso Resources Canada Limited property. Drilling by Teck Exploration Limited encountered a hematitic intermediate schist, containing a trace of molybdenite similar to Lytton's "Hematitic Ash Tuff" or mylonite (Resident Geologist's Files, Ontario Min-

istry of Northern Development and Mines, Thunder Bay).

5. Gold Fields Mining Corporation carried out cross-sectional drilling on the International Laco Resources Limited and Triple Crown Resources Limited properties (west of the Golden Sceptre property). Drilling encountered extensive units of ultramafic metavolcanics, containing spinifex textures, previously unknown in the stratigraphy of the belt.
6. Drilling on the Interlake Development Corporation property by Noranda Exploration Company Limited encountered a number of mineralized zones including the possible down dip extension of the Lac Minerals Limited C-Zone. Hole 1L-2-XW returned 136 feet of 0.05 ounce gold per ton (The Northern Miner, July 11, 1985). Hole 1L-2X returned 24.7 feet of 0.186 ounce gold per ton (George Cross News Letter, No. 90, 1985).
7. Fleck Resources Limited has purchased the Anaconda Canada Exploration Limited property 8 km northeast of Marathon. The initial work in the 1960s by Anaconda Canada Exploration Limited outlined 34.4 million tons averaging 0.039 ounce platinum/palladium per ton and 0.47% copper (1985 Fleck Resources Limited Annual Report) hosted in a gabbro on the eastern margin of the Coldwell Complex. Fleck Resources Limited carried out a program involving the re-assaying of the core, stripping, trenching, geological mapping, and diamond drilling.

BEARDMORE–GERALDTON ECONOMIC GEOLOGIST PROGRAM by J.K. Mason and G.D. White

INTRODUCTION

The Beardmore-Geraldton Economic Geologist Program is funded by the Ontario Ministry of Northern Development and Mines. The program was staffed by John Mason and by Gerry White until November 1985. The objective of the program is to stimulate exploration activity in the Beardmore-Geraldton area by assisting prospectors and mining activities with property visits, sampling, mapping, literature searches, field trips, documentation of all occurrences, and interpretation of various geological environments.

PRODUCING GOLD MINES AND MAJOR EXPLORATION PROGRAMS

Teck Corporation (Leitch Division) milled approximately 45 000 tons of screened dump material, from the Leitch Gold Mine, at the former Pan-Continental Mining (Canada) Limited Mill (1984-85) (R. Dunning, Project Superintendent, Teck Corporation (Leitch Division), Beardmore, personal communication, 1985). The mill closed temporarily on January 31, 1985. Northern Concentrators milled 200 tons of ore from the Crooked Green Creek #1 zone in Pifher Township.

Phoenix Gold Mines Limited continued with year two of a multi-phase exploration program on the Quebec-Sturgeon River Gold Mine property, located in Irwin, Pifher, Walters, and Elmhirst Townships. Geological mapping, overburden geochemistry, stripping, trenching, channel sampling, and bulk sampling were conducted on ground lying east and north of the main underground development.

Muscocho Explorations Limited initiated a major exploration program on the Tashota-Nipigon Mine property in the Onaman Lake area. Approximately 4500 m of diamond drilling was supplemented by extensive stripping.

Atlantic Mining Corporation conducted exploration programs at two locations. At the Sand River Mine site, an experimental mill, termed the Dunbar Pulverizer 3M9, was installed to concentrate gold-bearing vein quartz from the "Sand River Vein" and the waste dump. The mill uses compressed air to collide jaw crushed 1/4 inch quartz fragments. Stripping, trenching, channel sampling, air magnetometer and air E.M. surveys were conducted on the Twin Falls property in Irwin-Pifher Townships.

Metalore Resources Limited continued diamond drilling the Brookbank Prospect and western parts of their extensive claim holdings in Irwin Township.

Canamax Resources Incorporated diamond drilled a part of the Paulpic Prospect in the Tashota area. The tonnage and grade estimate prior to the 1985 drill program was 200 000 tonnes averaging 0.23 ounce gold per ton (Canadian Mines Handbook, 1984-85). Canamax Resources Incorporated also diamond drilled the Watson Lake (Theriault-Rentz Option) Occurrences, an eastern extension of the favourable Leitch Gold Mines iron formation horizon. A summary of the exploration program is outlined in Table 4.4.

GENERAL GEOLOGY AND STRUCTURE

The Beardmore-Geraldton area has been divided into two belts. The Beardmore-Geraldton Belt and the Onaman-Tashota Metavolcanic Belt are separated by the Paint Lake Fault, a major transcurrent fault.

A detailed description of the geology and gold mineralization of the Beardmore-Geraldton Belt is provided in Mason and McConnell (1983) and by Mason and White *in* Patterson *et al.* (1984, 1985).

GEOLOGY OF THE ONAMAN-TASHOTA METAVOLCANIC BELT

The Onaman-Tashota Metavolcanic Belt, a part of the Wabigoon Subprovince, is described by Mason and White *in* Patterson *et al.* (1984).

GOLD MINERALIZATION

Gold is hosted in two environments within the Onaman-Tashota Belt:

1. Vein Shear Zone Type. Gold is associated with quartz (carbonate) veins and shear zones hosted in metavolcanics, often marginal to felsic intrusions, e.g. Tashota-Nipigon Mine, Brenbar Mine, Quebec-Sturgeon Mine, Peddle Lake Occurrence (Phoenix Vein), Twin Falls Occurrence.
2. Chemical Metasediment Type. Gold is hosted by chemical metasediments (chert, iron formation), e.g. Paulpic Prospect and Deeds Lake (New Gol-

TABLE 4.4 COMPANY EXPLORATION PROGRAMS IN THE BEARDMORE-GERALDTON AREA 1985

Company	Township/Area	Exploration
Anaconda Canada Exploration Limited	Fort Hope Area	D.D.H.
Anglo-Canadian Mining Corporation	Pifher Township	D.D.H.
Atlantic Mining Corporation	Eva Township	Stripping, trenching, bulk sampling, D.D.H.
Atlantic Mining Corporation	Irwin-Pifher Townships	Stripping, trenching, sampling, A. Mag, A.E.M.
Canamax Resources Incorporated	Irwin Township	D.D.H.
Canamax Resources Incorporated	Tashota	D.D.H.
Carling Gold Resources Incorporated	Pifher, Elmhirst Townships	D.D.H.
Dome Exploration (Canada) Limited	Caribou Lake	Geology
Dome Exploration (Canada) Limited	Fort Hope Area	Geology
Dome Exploration (Canada) Limited	Lindsley Township	D.D.H.
Dome Exploration (Canada) Limited	Talbot Lake	Geology
Flin Flon Mines Limited	Long Lake	Prospecting
Giant Gripp Mines Incorporated	Marshall Lake	D.D.H.
Golden Tiger Exploration	Klotz Lake	Exploration
Gold Fields Canadian Mining Limited	Fort Hope Area	Geology, sampling
Harte Resources Limited	Tashota	Geology, mag.
Highland-Crow Resources (Quinterra Resources Incorporated)	Vincent Township	D.D.H., geology
Holmwood Resources	Sandra-Meader Townships	Geophysics, geology
Hudson Bay Exploration and Development Company Limited	Beardmore-Geraldton Area	Heavy mineral sampling
Hudson Bay Exploration and Development Company Limited	Dumas Lake	Exploration
Hudson Bay Mining and Smelting Company Limited	Legault Township	Prospecting
Jedi Exploration	Summers Township	Stripping, trenching
Kerr Addison Mines Limited	Fort Hope Area	Linecutting, geology, geophysics
Metalore Resources Limited	Irwin Township	D.D.H.
Monopros Limited	Beardmore-Geraldton Area	Heavy mineral sampling
Muscocho Explorations Limited	Onaman Lake	D.D.H., sampling
Noranda Exploration Company Limited	Bicknell Lake	Geology
Phoenix Gold Mines Limited	Irwin, Pifher, Walters, Elmhirst Townships	Geology, geochemistry, stripping, trenching, diamond drilling
Prago Resources and Energy Incorporated	Irwin Township	D.D.H.
Teck-Retlaw Resources Incorporated	Tashota	D.D.H.
Thorco Minefinders	Pifher Townships	Stripping, trenching, sampling

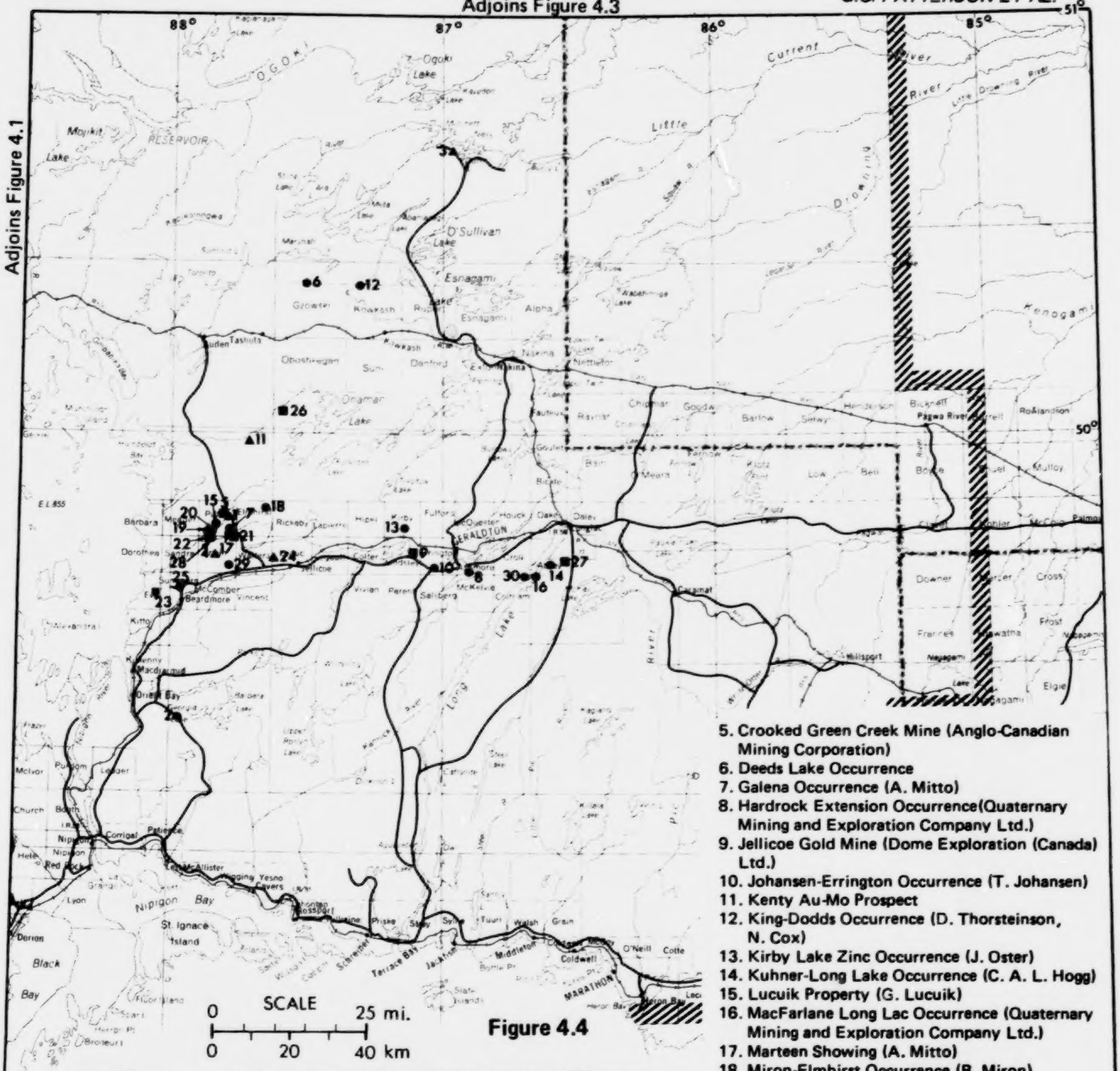

Adjoins Figure 4.3
Adjoins Figure 4.1
88°
87°
86°
85°
51°
50°
OGOKI
RESERVOIR
Mojikit Lake
Ogoki Lake
O'Sullivan Lake
Esnagami Lake
Current River
Little Drowning River
Drowning
Kenogami
Onaman Lake
Long Lake
Nipigon Bay
St. Ignace Island
Black Bay
Terrace Bay
Schreiber
Rossport
Marathon
Heron Bay
Nipigon
Red Rock
Dorion
Beardmore
McComber
Geraldton
Jellicoe
Tashota
Kitto
Macdiarmid
Orient Bay
Hillsport
Caramat
Nakina
Pagwa River
Bicknell
Elgie
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Figure 4.4

■ MINE (including past producers)	with a minimum production of not less than 100 ounces of gold
▲ PROSPECT	with significant development work usually consisting of one or more of the following: (a) Production of less than 100 ounces of gold; (b) Over 100 feet of underground lateral development work; (c) Over 600 metres (2000 feet) of diamond drilling.
● OCCURENCE	Little development work carried out

PROPERTY VISITS 1985: BEARDMORE-GERALDTON
Economic Geologist Program

1. Betcherman Property (P. Betcherman, T. Headland)
2. Blay Lake Lithium Occurence
3. Briarcliffe Lake - Melchett Lake Iron Deposit (Dofasco)
4. Brookbank Prospect (Metalore Resources Ltd.)
5. Crooked Green Creek Mine (Anglo-Canadian Mining Corporation)
6. Deeds Lake Occurrence
7. Galena Occurrence (A. Mitto)
8. Hardrock Extension Occurrence(Quaternary Mining and Exploration Company Ltd.)
9. Jellicoe Gold Mine (Dome Exploration (Canada) Ltd.)
10. Johansen-Errington Occurrence (T. Johansen)
11. Kenty Au-Mo Prospect
12. King-Dodds Occurrence (D. Thorsteinson, N. Cox)
13. Kirby Lake Zinc Occurrence (J. Oster)
14. Kuhner-Long Lake Occurrence (C. A. L. Hogg)
15. Lucuik Property (G. Lucuik)
16. MacFarlane Long Lac Occurrence (Quaternary Mining and Exploration Company Ltd.)
17. Marteen Showing (A. Mitto)
18. Miron-Elmhirst Occurrence (B. Miron)
19. Peddle Lake Occurrence (D. Thorsteinson, N. Cox, P. Lassila)
20. Peddle Lake-River Road Occurrence (J. Ternowesky, P. Skalesky)
21. Quebec Sturgeon River Gold Mine (Phoenix Gold Mines Ltd.)
22. Reiter Occurence (Atlantic Mining Corporation)
23. Sand River Gold Mine (Atlantic Mining Corporation)
24. Solomon's Pillars Prospect (Inco Exploration Ltd.)
25. Standingstone Creek Occurrence (E. Rentz)
26. Tashota-Nipigon Mine (Muscocho Explorations)
27. Theresa Gold Mine (Conscot Resources Ltd.)
28. Twin Falls Occurrence (Atlantic Mining Corporation)
29. Watson Lake Occurrence (Canamax Resources Incorporated)
30. West Side Long Lac Occurrence (Quaternary Mining and Exploration Company Ltd.)

dvue Mines) Occurrence hosted in metavolcanics.

Tashota-Nipigon Mine

The Tashota-Nipigon Mine is located immediately northwest of Onaman Lake and south of Oboshkegan Township. The original discovery was made by J. McKechnie in 1923 on claim KK524 and mining development commenced in 1928. From 1935 to 1938, production totaled 12 355.7 ounces of gold, 14 527 ounces of silver, and 360 306 pounds of copper (Mineral Resources Branch, Department of Energy, Mines and Resources, Ottawa). Tashota-Nipigon Mines and International Mine Services Limited undertook exploration programs after the mine closed. During 1985, Muscocho Explorations Limited initiated a 4570 m (15 000-foot) drill program supplemented by stripping.

The property is underlain by pillowed (variolitic) and massive mafic metavolcanics, termed the "footwall zone" by Muscocho Explorations Limited (H. Matthews, Geologist, Muscocho Explorations Limited, personal communication, 1985). Granodiorite and gabbro appear to have intruded lower in the sequence. The metavolcanics commonly contain 2% chalcopyrite and pyrrhotite. Alteration minerals are biotite and epidote, the latter noticeable in pillow selvages and fractures. Gold mineralization is associated with the central and upper part of the metavolcanics.

Overlying the metavolcanics is a 9 to 25 m thick oxide/sulphide facies iron formation. Chert-chlorite, chlorite-garnet-magnetite, siltstone and magnetite-chert beds occur within the iron formation unit. Pyrite commonly occurs within a matrix of coarser pyrrhotite. Minor chalcopyrite is also present. Regionally, the stratigraphy dips to the north, but in detail it is tightly folded and plunges 55° to 65°NW.

Main mine production has come from the A zone, which outcrops on surface approximately 6 m west of the shaft. The zone, which has been described by Tindale (1967) and Moorhouse (1939), is present as a lenticular sheet-like orebody ranging from 0.5 to 2.0 m thick on the 625 foot (190 m) level and 720 foot (220 m) level, respectively. The zone is composed of highly silicified mafic metavolcanics with foliation parallel quartz veining and associated disseminated pyrrhotite and chalcopyrite. The total sulphide content is typically 2% and alteration minerals present are epidote and biotite. Biotite is closely associated with gold mineralization (H. Matthews, Geologist, Muscocho Explorations Limited, Toronto, personal communication, 1985). Moorhouse (1939) reported that under the A Zone a deep surface "drill hole to 925 feet gave an average value of 0.33 ounces per ton over a true width of 13.1 feet." During 1985, Muscocho Explorations Limited completed several drillholes below the 625 foot (190 m) level and intersected A-type mineralization.

Diamond drilling was also completed on the D and G zones (Zone A through G are present on the property). The D zone may be a faulted extension of the A zone while the G zone is a series of quartz lenses hosting gold and pyrrhotite. The zones are all interpreted to be lenses that approach each other down plunge to the west. The G zone is located approximately 275 m (900 feet) west of the old shaft. The Northern Miner (October 14, 1985) reported the following:

> The two deepest holes on the zone to date were drilled 50 feet apart and both intersected the gold bearing structure at a vertical depth of 285 feet. They returned assays of 0.37 oz gold per ton over 5 feet and 0.26 oz gold per ton over 4.5 feet, respectively.

Elmhirst-Miron Occurrence

In 1985, Bill Miron discovered a new gold occurrence on claim TB81378, located 1 km northwest of Wilkinson Lake, within the northeastern part of Elmhirst Township.

The six-claim property (TB813373 to TB813378) straddles the contact between the Elmhirst Lake Stock, a granodiorite-quartz diorite intrusion, and intermediate to predominantly felsic metavolcanics mainly feldspar porphyry (Mackasey and Wallace 1978). The occurrence is hosted by granodiorite and consists of two parallel shear zones that have been exposed by stripping. The zones strike 333°, dip steeply to the east, and are separated by 30 m of unexposed bedrock. Much of the work to date (stripping and trenching) has been concentrated on the eastern zone (Zone #1) along a 67 m strike length. This zone is typically lenticular, up to 0.3 m in width, and consists of recrystallized quartz breccia material. Mineralization within the zone consists of, up to 10% fine pyrite present as thin discontinuous seams, disseminated coarser 1 to 3 mm euhedral pyrite, and rare patches of chalcopyrite. In addition, pyrite is associated with inclusions of granodiorite. Prominent pink potassic alteration is present and sericite was noted on the shear zone margins. The massive granodiorite host is mineralized and weakly altered for 0.6 m on either side of the breccia zone.

Gold mineralization occurs over a width of 1.5 m and is associated with the pyrite. The breccia zone-massive granodiorite contact is characterized by pyritic sericite hosting some of the better gold values.

Northern Concentrators have completed milling of 41.8 tons bulk sampled from zone #1. Head assays processed by Bondar-Clegg Company Limited averaged 0.325 ounce gold per ton (B. Miron, Prospector, Thunder Bay, personal communication, 1985).

Twin Falls Occurrence

The Twin Falls Occurrence is located in northwestern Irwin Township, 1 km northeast of Twin Falls, Sturgeon River, (Namewaminikan River). The occurrence, situated within a 41 claim group (TB746779) under option to Atlantic Mining Corporation, was discovered in 1985 by vendors J. Ternowesky and P. Skalesky.

The Twin Falls property occurs within the southern part of the Onaman-Tashota Metavolcanic Belt, and locally in a felsic metavolcanic unit which hosts the Quebec-Sturgeon River and Brenbar Mines. The claim group is underlain by a medium- to coarse-grained felsic metavolcanic breccia and feldspar and quartz-feldspar porphyry. The Musca Lake Fault transverses the southern boundary of the claim group and may have contributed to the intense shearing observed at the Twin Falls Occurrence. Regional foliation ranges from 90° to 110° with a steep southerly dip.

The Twin Falls Occurrence is situated in the extreme southwestern part of the claim group. A major backhoe stripping program has exposed a 60 m by 225 m pyritic zone hosted in highly sheared quartz-eye feldspar-porphyry or felsic tuff. The zone strikes at 102° and dips steeply to the south. Pyrite mineralization (ranging from 1% to 2%) is pervasive throughout the unit, occurring as fine subhedral to euhedral grains. Pyrite also occurs as more massive discontinuous conformable bands up to 5 mm in width and, in a few locations, as massive pyrite in vitreous quartz "veins". Carbonatization, silicification, and sericitization are present on a local and regional scale. It is within these zones of more massive pyrite mineralization that the highest gold assays were obtained. Detailed systematic channel sampling has recently been completed by Atlantic Mining Corporation (November 25, 1985) and results are pending. Grab samples collected by the author have assayed up to 0.74 ounce gold per ton (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Peddle Lake Occurrence

The Peddle Lake Occurrence is situated on the "River Road" in southwestern Pifher Township, on claim TB863167.

The occurrence was discovered in 1974 by Lynx-Canada Explorations Limited and examined as a copper occurrence. An I.P. survey completed during the same year detected an anomaly coincident with the occurrence. During 1985, the Peddle Lake Occurrence was backhoe stripped by P. Lassila, D. Thorsteinson, and N. Cox, holders of the claim.

The regional geology is similar to the Twin Falls Occurrence (*see* previous property description). The properties are underlain by intermediate to felsic metavolcanics of the Onaman-Tashota Metavolcanic Belt and lie 1.2 km apart. The copper occurrence, now known as the South Zone, was of little interest until mid-1985 when the gold potential of the Peddle Lake Occurrence was examined (a north zone has been uncovered, but is poorly exposed to date).

The south zone is a highly sheared feldspar-porphyry up to 2.5 m in width. It contains subhedral phenocrysts of feldspar typically crowded and homogeneous but it can have rare, stretched, lapilli-sized, feldspar porphyry fragments, and therefore, may be classified as an autobreccia. The south zone strikes 112° and dips 78°N. One to three percent chalcopyrite is present, as well as minor amounts of pyrite, bornite, and native copper.

Grab samples collected by the authors assayed up to 0.44 ounce gold per ton and 5.4% copper (Geoscience Laboratories, Ontario Geological Survey, Toronto).

Phoenix Gold Mines Limited

Phoenix Gold Mines Limited continued with year two of an exploration program on the Quebec-Sturgeon River Gold Mine property, 20 km northeast of Beardmore, Ontario. The property is situated at the common corner of Irwin, Walters, Pifher, and Elmhirst Townships on the south side of the Sturgeon River (Namewaminikan River) and consists of 35 leased claims. Between 1936 and 1942, the mine produced 73 438 ounces of gold grading 0.51 ounce gold per ton (Mason and McConnell 1983). During 1985, stripping, trenching, channel sampling, and bulk sampling were conducted on auriferous quartz veins east of the old mine site and Highway #801, and to a limited extent north of the shaft and west of the shaft. Basal till geochemical surveys and detailed geological mapping were continued over much of the entire property.

Mackasey (1975) described the geology over the property:

> The area is underlain by intermediate to felsic metavolcanics that have been intruded by granodiorite, mafic dikes, quartz veins and diabase dikes. The metavolcanics are medium grey to dark green and vary from massive to foliated.

Veining is proximal to the contact between the metavolcanics and the Elmhirst Lake Stock (granodiorite and quartz diorite) to the north and the Coyle Lake Stock (granodiorite) to the east.

Work during the 1984 and 1985 field seasons has located some 15 new veins, additional to the 67 veins previously documented on the property. East of Highway 801, veins A-2, A-4, A-6, A-9, 85-A-2, 85-A-5, and 85-A-6 are the most significant gold targets located to date. (Note: prefix A denotes Aguara property, the east part of the Phoenix Gold Mines Limited property). All veins are hosted by feldspathic and porphyritic rhyolite to dacite and, to a limited extent, by granodiorite or quartz diorite. Lenticular quartz and quartz-carbonate veins are associated with ductile shearing and, more commonly, with simple, single fractures. Local shearing, represented by sericite schist, is displayed at vein contacts. Veins range up to 0.9 m in width and two distinct vein sets have been noted: one striking 45° to 65° (approximate) and the other striking more northerly. The #3 production vein strikes 13°. Silicification is the main form of alteration noted in the felsic metavolcanics.

Two veins discovered in 1985, 85-A-2 and 85-A-5, host good visible gold and a new extension of A-9 also contains visible gold.

The character of the veins is variable. Vein A-2 is 915 m long, strikes 45° and is composed of white quartz containing clots and disseminations of chalcopyrite, pyrite, and native gold. Generally, <2% total sulphides are present. Contrasting with A-2 is vein A-4 which is a cherty brecciated zone of interbanded sphalerite, magnetite, ilmenite, chalcopyrite, quartz and carbonate containing up to 15% total sulphides. Veins A-4 and A-6 strike northerly. A-6 is 60 m long and primarily a vitreous quartz vein containing pyrite, chalcopyrite, and sphalerite. Assays up to 1.235 ounces gold per ton on chip samples across the vein were reported by Phoenix Gold Mines Limited (L. Koskitalo, Project Geologist, Phoenix Gold Mines Limited, Toronto, personal communication 1985).

Veins 85-A-2 and A-9 are crack-seal type veins similar to the #3 production vein, hosting coarse visible gold associated with sericite, chlorite, or carbonate seams. (Crack-seal texture implies parts of the former wall rock were broken away as the quartz vein was generating.)

Vein 85-M-1 is a new gold occurrence located approximately 480 m north of the shaft area on the former Macjoe property, now a part of the Phoenix Gold Mines Limited property. This quartz occurs in altered granodiorite, strikes approximately 15°, and averages 36 to 56 cm (up to 1.2 m) in width. Assay results indicate an average grade of 0.825 ounce gold per ton over an average width of 47.2 cm for a length of 150 m (O.A. Seeber, President, Phoenix Gold Mines Limited, Toronto, personal communication, 1985).

RECOMMENDATIONS FOR EXPLORATION

Exploration for gold is recommended within parts of the Onaman-Tashota Metavolcanic Belt, where the potential for the discovery of medium to large tonnages of gold-bearing disseminated sulphide deposits are present. Areas that contain vein-type gold mineralization should be prospected for disseminated auriferous sulphide (pyrite, pyrrhotite, chalcopyrite) zones, similar to the Peddle Lake and Twin Falls discoveries. Sulphide zones within intermediate to felsic metavolcanics from the Irwin-Pifher-McComber Townships area north to the Marshall-O'Sullivan Lake area should be assayed for gold. Historically, mainly the vein type gold deposits and occurrences have been trenched and mined in the Onaman-Tashota Belt. When gold values are detected in sulphide zones, induced polarization, stripping, and channel sampling, followed by diamond drilling should be used to evaluate such targets.

The area from O'Sullivan Lake to Maun Lake should be re-examined. Copper and arsenopyrite occurrences are frequently associated with gold and silver.

Gold mineralization is associated with metamorphic biotite at the Tashota-Nipigon Mine. Other sulphide occurrences, or biotite schist zones often associated with chloritic metavolcanics, should be assayed for gold.

Extensions of the Bankfield-Tombill Fault within the main Beardmore-Geraldton Belt should be explored for fault generated feldspar porphyries, silicified and pyritic metasediments, and iron formation hosting possible replacement sulphides, all of which may contain auriferous zones. Magnetometer surveys, I.P. surveys, overburden till sampling, and backhoe to bulldozer stripping programs are recommended.

SCHREIBER–TERRACE BAY ECONOMIC GEOLOGIST PROGRAM by B.R. Schnieders and A.A. Speed

INTRODUCTION

In 1985, the Schreiber-Terrace Bay Economic Geologist Program entered its third year of operation. The program was initiated and is funded by the Ontario Ministry of Northern Development and Mines.

B.R. Schnieders and A.A. Speed are responsible for the program and work out of the Resident Geologist Office.

The purpose of the program is three-fold:

1. To provide assistance and information to prospectors and mining companies working in the area.
2. To document old and new mineral occurrences and establish a database.
3. To stimulate mineral exploration and to monitor the exploration activity.

The program covers an area from Nipigon east to Marathon.

During 1985, approximately 35 properties were visited in the program area (Figure 4.5, Table 4.5). All assays reported in the following property descriptions were performed by the Geoscience Laboratories, Ontario Geological Survey, Toronto, unless otherwise noted.

GENERAL GEOLOGY

The general geology of this area is described by B.R. Schnieders and A.A. Speed in Patterson *et al.* 1985.

ECONOMIC GEOLOGY

Exploration for gold and base metals in the Schreiber-Terrace Bay area remained at a high level during 1985, with the staking of more than 90% of the "high potential" ground (metavolcanics and metasediments). The area has been actively explored since the late 1800s. The area's exploration history is summarized in Patterson *et al.* 1985.

GOLD MINERALIZATION

Recent studies on controls of gold mineralization and the role of felsic intrusions in gold mineralization have been performed by Carter (1980a, 1980b), Marmont and Colvine (1981), Marmont (1983, 1984), and Patterson *et al.* 1984). The following subdivision of gold mineralization types incorporates results of the above studies and is based on a modification of the classification suggested by Patterson *et al.* (1984, 1985).

Type 1: Terrace Bay Batholith-Contact Zone Type

Gold mineralization is concentrated in quartz ± carbonate veins, occupying faults, fractures, and shear zones spatially related to the contact rocks of the Terrace Bay Batholith.

This type of mineralization is described in Patterson *et al.* (1985). During the 1985 field season, approximately two weeks of detailed mapping, at a

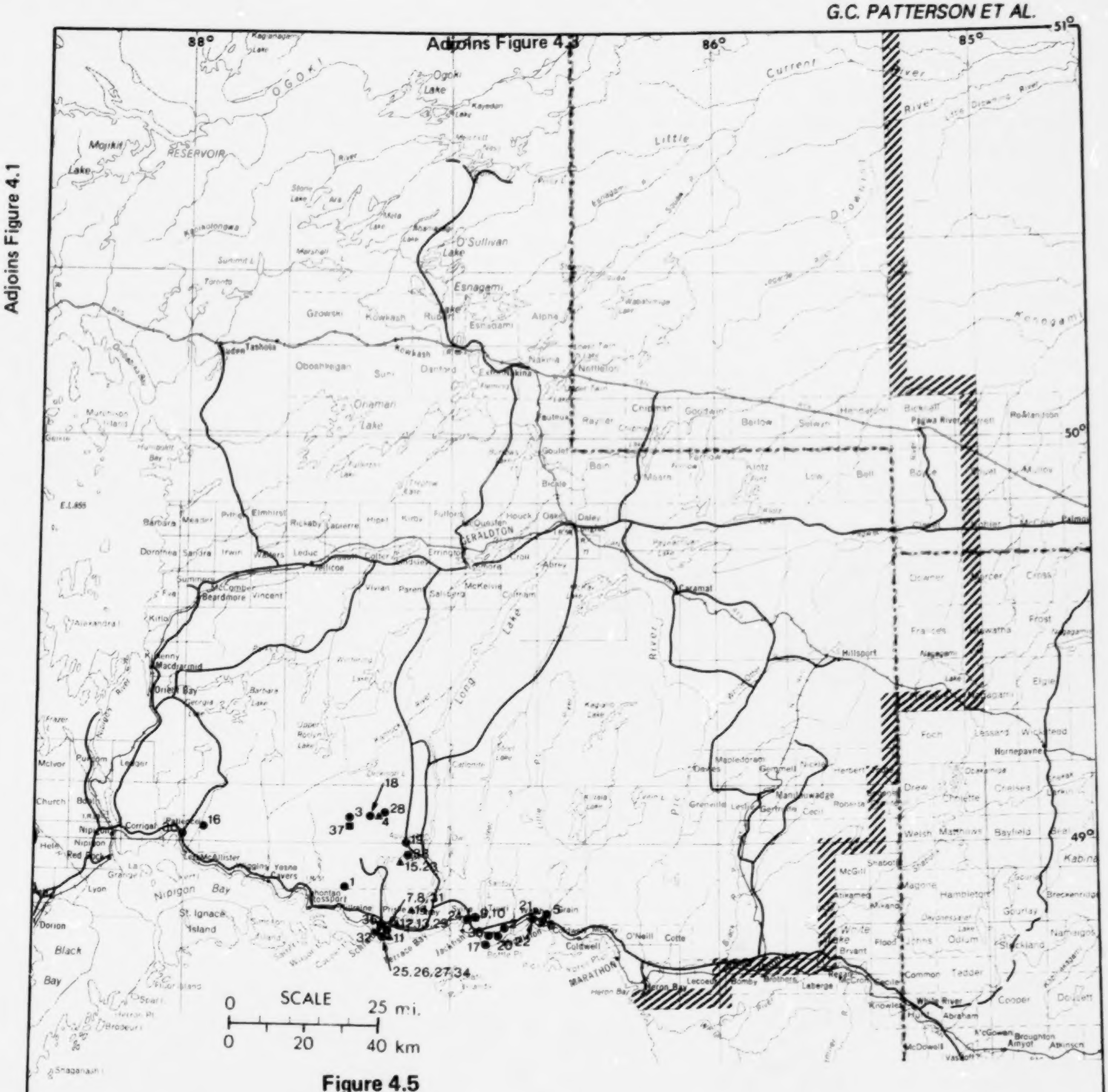

Adjoins Figure 4.3
Adjoins Figure 4.1
88°
86°
85°
51°
50°
49°
OGOKI
RESERVOIR
Ogoki Lake
O'Sullivan Lake
Esnagami
Nakina
Ombabika
Onaman Lake
GERALDTON
Beardmore
Macdiarmid
Orient Bay
Hillsport
Manitouwadge
Nipigon
Red Rock
Nipigon Bay
St. Ignace Island
Black Bay
Rossport
Schreiber
Terrace Bay
Jackfish
Coldwell
MARATHON
Heron Bay
White River
Hornepayne
Long Lake
Pic River
Current River
Kabina
1
3
4
5
16
18
28
37
7,8,31
9,10
11
12,17,29
13
15,23
17
19
20,22
21
24
25,26,27,34
30
32
36
SCALE
0
25 mi.
0
20
40 km

Figure 4.5

Property Visits, 1985: Schreiber-Terrace Bay Economic Geologist Program

■ MINE and/or PROPERTIES UNDER DEVELOPMENT

▲ PROSPECT

● OCCURRENCE

1) Acker Zinc Occurrence
2) Blackfox Lake Occurrence
3) Ciglen Occurrence
4) Coco-Estelle Prospect
5) Deadhorse Creek Diatreme
6) Deadhorse Creek (North) Prospect
7) Downey (East) Occurrence
8) Downey (West) Occurrence
9) Elgin Occurrence
10) Fishnet Creek Occurrences
11) Gale Prospect
12) Gold Range Prospect
13) Harkness-Hays Prospect
14) Hays Lake Prospect
15) Johnston-McKenna Prospect
16) Kama Hill Occurrence
17) Kingdom Occurrence
18) Line 12 Occurrence
19) Little Bruin (Bear) Occurrences
20) Little Steel Occurrences
21) MacKellar Bay Mines Prospect
22) McKellar Creek Diatreme
23) McKenna-McCann Prospect
24) Mogotherium Occurrence
25) Morley High Grade Occurrence
26) Morley Pyrite Occurrence
27) Morley Road Occurrence
28) Nelson Occurrence
29) Otisse Prospect
30) Ozone Creek Occurrence
31) Pitkanen Occurrence
32) Schreiber Beach Occurrence
33) Schreiber-Pyramid Occurrence
34) Schreiber Rail Occurrence
35) Schreiber Road Occurrence
36) Simard-Swetz Occurrence
37) Winston Lake Deposit (Corporation Falconbridge Copper)

TABLE 4.5 EXPLORATION PROGRAMS IN THE SCHREIBER-TERRACE BAY AREA IN 1985

Company/ Individual(s)	Township Area	Exploration Activity
Acker, W.	Priske, Strey Townships	Bulk sampling, trenching, stripping
Barracuda Resources Limited	Lower Aguasabon Lake	Geophysical and geochemical surveys
Corporation Falconbridge Copper	Winston Lake, Cleaver Lake, Big Duck Lake	Diamond drilling, shaft sinking, geological surveys, mine development, prospecting, sampling
Eldor Resources Limited	Tuuri Township	Prospecting
Ferguson, A., Ferguson, J.	Syine Township	Prospecting, trenching
Fleck Resources Limited	Marathon	Diamond drilling
Galarneau, T., Patterson, R.	Kabamichigama Lake	Mining, trenching, stripping
Halonen, L.	Middle Fox Lake, Yesno Township	Trenching
Hamel, R.	Fishnet Creek	Prospecting, trenching, sampling
Hein, H.	Orient Bay	Prospecting
Hicks, C.	Kabamichigama Lake	Prospecting
Kingdom Resources Limited	Tuuri Townships	Prospecting, sampling
Lincoln Resources Limited	Priske Township, Killraine Township	Geological mapping, prospecting, sampling, trenching, stripping
McGuire, D.	Nipigon	Prospecting
Merkose, L.	Yesno Township	Trenching
Micham Exploration Incorporated	Syine Township	Diamond drilling
Michano, D.	Walsh Township	Stripping, trenching
Noranda Exploration Company Limited	Killraine Township	Diamond drilling
OreQuest Consultants	Lower Aguasabon Lake, Santoy Lake, Strey, Syine Townships	Geological surveys, trenching
PatMikko Resources Limited	Priske Township	Trenching, stripping, property development
Robineau, C.	Terrace Bay	Prospecting
RTC Precious Metals Incorporated	Priske Township	Geological mapping, stripping, trenching, bulk sampling
Sande, N.	Kabamichigama Lake	Prospecting
Tecumseh (Thrust) Resources Limited	Santoy Lake, Tuuri Township	Geophysical, geochemical surveys
Zahavy Mines Limited	Winston Lake	Diamond drilling

scale of 1:2000, was conducted over the Harkness-Hays and Gold Range properties, which are two examples of this style of mineralization.

Harkness-Hays and Gold Range Properties: The Harkness-Hays and Gold Range Properties are located north of Highway 17, in Priske Township, approximately 4 km east of Schreiber. These properties underwent development during a period from 1917 to 1941. Production was 194 ounces of gold from the Harkness-Hays Property from 1935 to 1936, and 17 ounces of gold from the Gold Range Property in 1941 (Marmont 1984). Gold mineralization is concentrated in a series of quartz ± carbonate veins which are generally *en echelon* and can occur subparallel to the contact of the batholith. The most important veins referred to by previous workers are the No. 1, No. 2, No. 3, and No. 7 veins (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

On the Harkness Hays property, the gold-bearing quartz ± carbonate veins are hosted predominantly by mafic metavolcanics. However, mapping has indicated that in addition to the mafic metavolcanics, the host rocks also consist of quartz-feldspar porphyry and iron formation including chert, massive pyrite sections, and graphitic-pyritic slate.

The iron formation is tightly folded and plunges 58°NE. The presence of up to three adits and numerous old trenches indicates that previous workers explored for gold within the iron formation. Sampling by Sylvanite Gold Mines Limited in 1939 indicated generally discouraging gold values except for assays of 0.08 and 0.16 ounce gold per ton each over 10 cm (4 inches). Analyses by the authors indicated values of 45 ppb gold in the chert, 27 ppb gold in the pyritic-graphitic slate and 65 ppb gold in the massive pyrite sections.

Numerous ages of granitic intrusions were noted on the property, the origins of which are likely due to a polyphase intrusive event related to the emplacement of the Terrace Bay Batholith. The most noticeable phase is a white quartz-feldspar porphyry, which occurs as dikes and is commonly in contact with or partly hosting the vein systems. They appear to be genetically related to the auriferous veins. A reddish biotite-hornblende granite is commonly observed crosscutting the porphyry. Other possible syentitic phases of the intrusion exist.

The rocks in the Harkness-Hays-Gold Range area have been intensely faulted and fractured. This is evident on top of the Gold Range Ridge. Airphoto interpretation indicates a conjugate set of faults striking northeast and northwest. The northwest-striking fault set has apparently offset the Gold Range Ridge, in a dextral sense, up to 0.5 km. There are two prominent lineaments or faults striking northeast that envelop the old development area. Within this 0.5 km by 1 km section, smaller conjugate fault systems strike northwest, east, and northeast. In excess of 25 small-scale lineaments were observed. Field evidence indicates that many of these lineaments represent faults. The vein systems occupying these faults are often brecciated.

A contact metamorphic halo and hydrothermal alteration is particularly well developed where the mafic metavolcanics are in contact with the Terrace Bay Batholith. The aureole is 200 to 300 m in width and often gradational, extending from the contact into the metavolcanics. The auriferous vein systems occur within this zone. The metavolcanics within the contact aureole are generally amphibole rich and contain few primary textures. Near the actual granitic-metavolcanic contact, the metavolcanics resemble a mafic intrusion such as gabbro or diorite. This is believed to be a result of recrystallization during amphibolite facies metamorphism. Outside the contact metamorphic aureole, the metavolcanics are generally chlorite rich and contain numerous primary textures. Typical greenschist facies metamorphism predominates.

In addition to the vein systems described in Patterson *et al.* (1985), other mineralized second-order, composite vein systems striking 70° and dipping nearly vertical were observed hosted in the mafic metavolcanics and in contact with the porphyry dikes. One of the veins ranges up to 2 m in width, but averages <30 cm. Two adits have been developed on the vein and sampling by Sylvanite Gold Mines Limited in 1939 indicated 0.46 ounce gold per ton over 25 cm (10 inches) for 33 m (109 feet) (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

A polyphase intrusive event could account for the production of numerous generations of veins, and for causing brecciation of earlier veins along faults, resulting in a reconcentration of gold within secondary or later vein generations.

It seems logical to assume that the fractured metavolcanics acted as conduits for metamorphic-hydrothermal fluids produced during intrusive activity. Furthermore, the intensity of the fracturing could provide enough access for the solutions to leach gold from the volcanic pile. The presence of the sulphide facies iron formation may have been significant, enriching the solutions in iron, possibly producing a sulphidization event. Geochemical evidence from unaltered and altered host rocks indicate that the altered host rocks display carbonatization, sericitization (K_2O enrichment), sodium (Na_2O) depletion, and pyritization.

Type 2: Porphyry Contact Zone Type

Gold mineralization with subsidiary silver, zinc, copper, lead, and molybdenum occur in quartz, carbonate, or quartz-carbonate veins and spatially associated with felsic porphyries. Examples of this type of mineralization occur in the Big Duck Lake area, 30 km north of Schreiber. Quartz, feldspar, and quartz-feldspar porphyries intrude several rock types. The sill-like porphyry bodies strike east-west and dip steeply, 65° to 70°N, and are considered to have formed late in the tectonic history. Pye (1964) suggested that the porphyries are genetically related to the granitic rocks. Mapping by Corporation Falconbridge Copper suggested possible extrusive and intrusive phases of the porphyry, representing a synvolcanic sublayer intrusion (Patterson *et al.* 1984).

The veins systems are further described in Patterson *et al.* (1985).

Recent work by Corporation Falconbridge Copper has identified numerous gold-bearing zones along the northern contact of the Big Duck Lake Porphyry. The contact area consists of sheared, gradational intrusive to extrusive phases of the porphyry, in contact with predominantly sheared mafic metavolcanics.

Gold values in the sheared, sericitic quartz porphyry and quartz-feldspar porphyry indicate up to 0.13 ounce gold per ton. Minor amounts of molybdenite are also present.

Occurrences include the Nelson Pit, Porphyry Shaft, and North Shore Zone.

Type 3: Metavolcanic Hosted - Dilatant Zone Type

Gold mineralization occurs in quartz and carbonate veins within shear zones, fractures, and cleavage dilation zones within predominantly mafic metavolcanics. Carter (1980a, 1980b) defines these deposits as structurally controlled and related to northwesterly striking shear zones. The gold is associated with silver, copper, zinc, lead, and molybdenum. Numerous ages of veining may be present. The metavolcanic-metasedimentary host rocks generally display sericification and carbonatization. Examples of this style of mineralization may include the Schreiber-Pyramid, Empress, McKenna-McCann, Johnston-McKenna, Morley High Grade, and the Little Bruin (Little Bear) Properties. The Little Bruin and Schreiber-Pyramid Properties might more adequately represent an example of gold concentration related to chemical sedimentary rocks (Type 4). It is possible that an overlapping of genetic models occurred.

McKenna-McCann Property: The McKenna-McCann property is located approximately 5 km northeast of the town of Schreiber, in the central part of Priske Township.

Exploration and development on the property dates back to 1934, with the majority of the work being done by Cook Lake Gold Mines, in the late 1930s, and includes the sinking of a 35 m shaft.

A parallel set of four *en echelon* quartz veins strike to the northwest, varying from 280° to 330° and dip 55° to 70°SW. The zone containing the veins is approximately 25 m wide. The individual veins are lenticular averaging 33 cm in width and have been traced along strike for up to 225 m. They occupy narrow shear zones or shear dilatent zones within a large northwest-trending structure. The shear zones indicate a sinistral sense of motion. The host rock is a highly carbonatized, pillowed metavolcanic rock. Analyses indicate up to 50 ppb gold in the carbonatized metavolcanics. The veins display a crack-seal or ribbon texture, and mineralization consists of chalcopyrite, pyrite, pyrrhotite, galena, tellurides and visible gold. Accessory minerals include chlorite, sericite, and green mica. The fine visible gold commonly occurs along sericite or chlorite slickensides or fractures. Coarse visible gold occurs with chalcopyrite and galena.

Samples collected by the author indicated values from trace to 0.94 ounce gold per ton. This generally supports values of 0.82 ounce gold per ton, obtained from a 12-ton bulk sample collected by Cook Lake Gold Mines in 1938 (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

Similar vein systems were encountered on the Johnston-McKenna property with scattered, erratic values in gold.

Type 4: Chemical Sediment-Stratabound Type

Gold mineralization can be associated with "Algoman-type banded iron formation" and related chemical and clastic sedimentary rocks. The iron formation and exhalative sedimentary rocks commonly occur at metavolcanic-metasedimentary rock contacts or at pauses between volcanic events. Sulphide facies iron formation predominates in the Schreiber-Terrace Bay area, and these units commonly consist of bedded pyritic-graphitic shale, and massive and laminated chert. Variable amounts of pyrrhotite, chalcopyrite, galena, sphalerite, silver, and gold are present. Gold content within the iron formation is commonly anomalous ranging from 10 to 300 ppb (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). Examples of this style of mineralization include the Kingdom, Simard-Swetz, Little Steel, Black Fox Lake, Morley Pyrite and Morley Road, Otisse, and possibly the Little Bruin and Schreiber-Pyramid Properties.

BASE METALS

Type 1: Volcanogenic Massive Sulphide Deposits

In the Schreiber-Terrace Bay area, base metals are associated with calc-alkalic felsic volcanic rocks. To date, the most significant discovery is that of Corporation Falconbridge Copper on their Winston Lake Property. The property is located 27 km northwest of Schreiber and includes the Zenith Deposit (Zenmac), which was discovered in the late 1800s.

According to Severin and Balint (1984):

> The Winston Lake massive sulphide deposit occurs at the top of the Winston Lake felsic volcanic sequence and is intimately associated with a cherty ash that marks the top of a package of felsic to intermediate volcaniclastics. The sulphide deposit occurs as a relatively thin sheet with an "average" true thickness of 4.3 metres and a length and width of 700 to 800 metres and 300 to 400 metres, respectively.

and,

> Surface diamond drilling suggests a mineral inventory (diluted) of 2,675,000 tonnes of 17.81% Zn, 0.94% Cu, 25.3 gm/t Ag and 0.85 gm/t Au.

The Zenith and Winston Lake deposits are further described in Patterson *et al.* (1985).

Corporation Falconbridge Copper made their official production decision on September 21, 1985, and then suspended development in early November 1985, due in part to slumping zinc prices (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay).

If production is reinstated, a 1000 tonne per day mill will be reconstructed at Winston Lake.

Type 2a: Zinc-Lead-Silver Veins - Metavolcanic Type

Zinc, lead, and silver mineralization is concentrated within narrow carbonate and quartz veins within shear zones, faults, and fractures, associated with metavolcanics and metasediments. Mineralization generally consists of massive sphalerite and galena within a banded carbonate vein. Silver appears in concentrations proportional to the galena content. The veins also contain minor chalcopyrite and gold mineralization. Accessory minerals include quartz, epidote, chlorite, sericite, and ankerite. Examples of this type of mineralization include the Deadhorse Creek North, Deadhorse Creek South, Morley High Grade, and McKellar Creek properties.

Type 2b: Lead-Zinc-Barite Veins - Unconformity Type

The lead-zinc-barite veins have been previously investigated by Tanton (1931) and Franklin and Mitchell (1977). The latter classified the lead-zinc-barite deposits of the Dorion property as spatially associated with the unconformity between Proterozoic and Archean rocks.

Franklin and Mitchell (1977) described the deposits as follows:

> The veins are coarse-grained, and mineralogically zoned with galena-calcite in the central zone, sphalerite-quartz surrounding the central zone, and barite (± chalcopyrite) in the vein extremities. Veins occur near the pinch-out of the "Pass Lake Formation" (basal Sibley Group), within the dolomite of the overlying "Rossport Formation", or in the nearby basement fractures. Rossport dolomite, where it forms a vein wall, is highly altered to metal-enriched chert and calcite. Archean wallrocks are not altered.

and,

> The deposits formed from metal leached from either basement rocks or breakdown of Sibley sandstone matrix. Metals and sulphide moved through the permeable sandstone, probably as chlorite-iron complexes, and precipitated at the sandstone pinch-out. Reduced sulphur, possibly derived from organic decay, and probably held in a gas trap at the sandstone pinch-out, caused precipitation of sulphides by reaction with metal-bearing brines.

Examples of Type (2b) include the Enterprise, Ozone, Dorion, Hilma, Silver Lake, Caribou, and Gordon properties.

Type 3: Copper-Molybdenum Vein Type

The copper-molybdenum mineralization occurs in quartz veins, quartz-feldspar offshoots, and aplitic and pegmatitic dikes (Marmont 1984). The veins are generally lenticular, discontinuous and erratic, displaying a banded, laminated, or crack-seal texture. Mineralization consists of chalcopyrite, molybdenite, pyrite, pyrrhotite, silver, and minor gold (generally <0.10 ounce gold per ton). Accessory minerals include chlorite, carbonate, sericite, and hematite. Alteration of the felsic intrusive host rock consists of sericitization, silicification, and hematization.

This type of mineralization is further described in Patterson *et al.* (1985).

EXPLORATION GUIDELINES

Gold

Exploration for gold in the Schreiber-Terrace Bay area should include a thorough re-examination and re-evaluation of past producers, prospects, and occurrences, discovered in the past 100 years.

Properties such as the Harkness-Hays, Gold Range, Hays Lake, and Empress have undergone minor development and production. Recent work on such properties indicates that several ages of veining are present and that complex intrusive and deformational events are related to the emplacement of the Terrace Bay Batholith. Exploration programs concentrating on large scale structures (conduits) or lithological variations where auriferous solutions may have been focused, are recommended. Marmont (1984) recommended detailed structural analyses of the vein systems in an attempt to reveal a more extensive zone of mineralization. The exploration targets for this type of gold mineralization commonly include pyritized host rocks and *en echelon* vein systems, for which an induced polarization survey may prove to be a useful tool.

Numerous auriferous veins are associated with the contact zones and peripheries of intrusions, including the Big Duck Lake Porphyry and Terrace Bay Batholith. Further exploration in these areas as well as in the vicinity of other felsic intrusions is warranted. Northeast and northwest-trending lineaments, such as those recently discovered on the McKenna-McCanna and Johnston-McKenna properties, should be explored and tested in the metavolcanics, metasediments, and peripheries of the intrusions.

Favourable gold target areas include a 4 km by 1.5 km section between Big Duck Creek and Hollinger Lake, and the northern contact of the Big Duck porphyry. Recent prospecting in both areas has discovered numerous vein systems and gold mineralization. Gold potential is also considered high within a 10 km radius of Schreiber, however, it is concentrated within the metavolcanics.

Algoman sulphide and oxide facies iron formation in the Schreiber-Terrace Bay area should be sampled and analyzed for gold in the parts per billion range. Although many of these units contain anomalous yet subeconomic levels of gold mineralization, they may represent protore in the sedimentary-exhalite source rocks. A later concentrating event, possibly related to deformation or intrusive events, could develop economic second-generation deposits.

Base Metals

Exploration for volcanogenic massive sulphide deposits in the Schreiber-Terrace Bay area is recommended in three general areas:

1. Winston Lake-Big Duck Lake Area: Exploration by Corporation Falconbridge Copper discovered a zinc-copper-silver-gold deposit hosted by calc-

alkalic intermediate to felsic metavolcanics in contact with a gabbroic intrusion(s). The host metavolcanics consist of pyroclastic flows, debris flows and laminated ash deposits. Intense hydrothermal alteration of these and associated metavolcanics have been responsible for the misidentification of such indicator rocks. Exploration by Corporation Falconbridge Copper has identified large areas of intense hydrothermal alteration, representing excellent exploration target areas.

2. Santoy Lake-McKellar Lake Area: A large felsic metavolcanic unit trends west-northwest and hosts numerous base metal occurrences including the Marlhill, Goldbar Lake, Bozena, Prairie River, and Granite Mountain properties. Felsic pyroclastic flows were observed in the Granite Mountain area. These clast-supported flows contained considerable garnet mineralization in the matrix component. Felsic metavolcanics in the Fishnet Lake area have been mapped as "andalusite-bearing tuffs" by Walker (1967) and may represent altered rocks. Iron formation and the related chemical and clastic metasediments commonly contain anomalous zinc, lead, copper, silver, and gold concentrations and should be explored.

   Also of economic interest is the Prairie Cove-Prince Point areas where felsic metavolcanics and chemical metasediments have been documented. These felsic metavolcanics may represent a folded extension of the Santoy Lake-McKellar Lake felsic metavolcanic belt.

3. Schreiber Point-Worthington Bay Area: Numerous narrow base metal-bearing veins, gold-bearing veins, and sulphide facies iron formation within mafic to intermediate metavolcanics are present. Sulphide facies iron formation and the related chemical and clastic metasediments appear to represent stratabound chemical exhalative sediments which contains low, however, anomalous concentrations of copper, zinc, silver, and gold. The iron formation units may represent distal parts of volcanogenic base-metal deposits.

   Exploration is recommended within the metavolcanic and metasediments near the western contact of the Port Coldwell Alkalic Complex. Several zinc-lead-silver rich veins have been discovered in this area.

   Exploration is also recommended within the mafic intrusive rocks of the Coldwell Alkalic Complex, as well as the contact metavolcanics. Recent exploration by Fleck Resources Limited on their Marathon property indicates copper, nickel, cobalt, gold, silver, rhodium, platinum, and palladium mineralization.

RECENT EXPLORATION ACTIVITIES

Corporation Falconbridge Copper continued the development of its Winston Lake Deposit (*see* Figure 4.2), including the sinking of a 510 m shaft. The shaft is presently being deepened to 680 m. They recently made their production decision in September 1985, and then suspended development in early November 1985. Work commissioned prior to November will be carried out (Barry Simmons, Manager, Corporation Falconbridge Copper, Thunder Bay, personal communication, 1985). This includes a 3.5 million dollar upgrade of the road, installation of a production hoist, and shaft deepening. Exploration in the Winston Lake area, including the Ciglen, Anderson, and Pick Lake areas continue. Drilling on the Pick Lake zone has encountered "a very thin sheet of high grade material" (The Northern Miner Press, September 30, 1985).

Corporation Falconbridge Copper is also exploring for gold and base metals in the Big Duck Lake area and at the Schreiber-Pyramid property.

Lincoln Resources Limited conducted geological mapping on numerous properties in the Schreiber area, including the Morley property. Exploration in the Morley area included geophysical (Max-Min II, Magnetometer), geochemical, and geological surveys as well as trenching, stripping and sampling. Drilling is slated for early 1986.

PatMikko Resources Limited conducted prospecting, trenching, stripping and sampling on their Johnston-McKenna property. Construction and installation has begun on their small scale gold mill on site.

RTC Precious Metals Incorporated conducted exploration and development on the McKenna-McCann property. Work consisted of geological mapping, trenching, stripping and sampling, including minor ore stockpile development.

Kingdom Resources Limited conducted exploration and sampling on their Kingdom property located in Tuuri Township.

Barracuda Resources Limited conducted linecutting, geophysical surveys, and sampling on its Aguasabon Lake property.

Zahavy Mines Limited conducted drilling on its property adjacent to Winston Lake. Drilling will test for extensions of possible massive sulphide mineralization zones.

Eldor Resources Limited carried out exploration in the Bozena Lake area in Tuuri Township. Base metal and gold mineralization has been previously documented in the area.

Thrust Resources Incorporated conducted geological mapping, prospecting, geochemical surveys, and airborne geophysical surveys on its Santoy Lake Property. The work outlined copper, zinc, molybdenum, and gold geochemical anomalies.

International Wildrose Petroleum Limited conducted sampling, geochemical, and geophysical surveys on their Prairie Cove-Prince Point property. The property is being explored for both gold and base-metal potential. Initial results indicate values of up to 2700 ppb gold and 5700 ppm zinc within chemical metasediments (Ian Campbell, Consulting Geologist, OreQuest Consultants Limited, personal communication, 1985).

Encouraging new discoveries were made by prospectors in the Schreiber-Terrace Bay area in 1985. These include Walter Acker and Russell Otto discovering the Acker Zinc Occurrence north of Sox

Lake. Zinc and copper mineralization is present within sheared and silicified metavolcanics.

Ray Mikkonen, Tom Patterson, and the authors rediscovered several vein systems on the Johnston-McKenna property. Assay results indicate encouraging but erratic gold values.

RESEARCH ACTIVITIES IN THE SCHREIBER-TERRACE BAY AREA

B.R. Schnieders, part-time graduate student, Lakehead University, Thunder Bay, continued research on sulphide-facies iron formation units as part of an M.Sc. thesis. Research began in late 1983 and will continue into 1986. Research in 1984 included detailed mapping, logging, sample collection and preparation, detailed structural analyses and stratigraphy of confined sections. In 1985, further detailed investigation of iron formation occurrences was carried out. Laboratory work includes microscopic examinations, whole rock geochemistry, and X-ray diffraction studies.

ATIKOKAN COBALT–BASE METALS–PLATINUM–GROUP ELEMENTS PROJECT by A.D. MacTavish and R.J.A. Dutka

INTRODUCTION

The Atikokan Cobalt-Base Metals-Platinum-Group Elements Project is presently in its second year of a proposed three-year tenure and is staffed by A.D. MacTavish and R.J.A. Dutka, Resource Geologists. The objectives of the program are:

1. To stimulate exploration for the base metals, cobalt, the platinum-group metals, and gold in the Atikokan Area.
2. To assist prospectors and junior mining companies in the area with property visits, advice, and literature searches.
3. To assist the mining companies interested in conducting exploration programs in the area by providing up-to-date information and files on the area's mineral occurrences.

The program to date has consisted of detailed mapping, sampling, assaying, and some petrographic work on the significant cobalt, base-metal, and platinum-group metal occurrences. Emphasis, in 1985, has been placed on the iron-copper-nickel-cobalt prospects within a 28 km long part of the Quetico Fault Zone; and the copper-nickel-platinum-palladium occurrences within the mafic to ultramafic plugs and sills in the Crooked Pine Lake area east of Atikokan. Five occurrences were mapped in detail. Property examinations for documentation and sampling purposes were done on four other cobalt, base-metal or platinum-group metal occurrences and nine gold occurrences in the general Atikokan area. Several informal field trips were conducted at the request of interested parties from the Ontario Geological Survey, private industry, and Lakehead University.

At the program's end, a report with maps will be prepared to document the location of all occurrences visited and to document their geological setting, petrochemistry, assay results, and mineral potential. Special emphasis will be placed on those areas that were examined in detail. Mineral and rock suites are in preparation for display at the Resident Geologist's Office in Thunder Bay and at the Ontario Geological Survey's Geoscience Seminar in Toronto.

GENERAL GEOLOGY AND STRUCTURE

The project area lies within the southern part of the Superior Province of the Canadian Precambrian Shield. The general geology and structure are described in Patterson *et al.* (1985).

DEPOSITS TYPES

In Patterson *et al.* (1984), the presence of five preliminary deposit types which might host cobalt, base-metal or platinum-group metal mineralization were described. These deposit types remain as stated except for "Type 1" which has been renamed the Atikokan River Intrusions rather than the Quetico Fault Zone-hosted Intrusions. This name change was made to avoid confusion with deposit Type 2, "The Quetico Intrusions". The five deposit types are now:

1. The Atikokan River Intrusions
2. The Quetico Intrusions
3. Chemical Metasedimentary Rocks
4. Shear Zones
5. Quartz Veins

Detailed geological mapping and sampling on examples of the deposit types 1 and 2 during the 1985 field season, are discussed below.

1) The Atikokan River Intrusions

Along 28 km of its length, from Crooked Pine Lake west to Atikokan, the Quetico Fault Zone, where it forms the Atikokan River valley, is host to six very similar-appearing, syntectonic, mafic to ultramafic intrusions. These intrusions are dike-like in appearance, very resistant to erosion, and in most cases form high, steep-sided ridges. Rock composition ranges from hornblende melagabbro to serpentinite. Syntectonic emplacement has resulted in almost pervasive shearing, the amount of which increases from the centre of the intrusions outward. Slickensides are common and the original texture of the rock is destroyed near the contact with the fault rocks. Fault-bound blocks and lenses of massive to semi-massive as well as disseminated magnetite are ubiquitous, and lenses and zones of occasionally fault-bound, disseminated to massive pyrrhotite, pyrite and chalcopyrite are also common. Net-textured pyrrhotite and chalcopyrite have been observed locally. Subsequent shearing has largely remobilized the sulphide mineralization. Three of the intrusions were mapped in detail in 1985, two of which are described below.

The Atikokan Iron Mine The Atikokan Iron Mine is located on Mining Locations E10, E11 and E12, in Hutchison Township, approximately 24 km east of Atikokan and about 1200 m east of Sapawe Lake.

The deposit was discovered in 1882 and has had a long mining and exploration history. By 1890, an exploration shaft was sunk and the first speculative tonnage of 2 000 000 tons of iron ore was stated (Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Thunder Bay). A number of diamond-drill holes, an adit, and numerous trenches were completed between 1899 and 1905. Active mining commenced in late 1905 and continued intermittently until production ceased in 1913. Production during that time is reported to have been 86 433 short tons of ore grading an average of 59.85% iron and 2% sulphur (Resident Geologist's Office, Ontario Ministry of Northern Development and Mines, Thunder Bay). From 1913 until the present, sporadic exploration activity has taken place including: bulk sampling for metallurgical analysis, diamond drilling, airborne and ground geophysics, and geological mapping and sampling. Prior to 1950, exploration activity was related to iron, however, since that time interest has shifted to copper, nickel, and cobalt. Recently, the mine has been re-examined for platinum-group metal content.

This abandoned deposit is contained within a high, steep-sided, erosion resistant, dike-like mass 1100 m long and up to 100 m wide, surrounded by low swampy ground. Lithologies observed range from sheared hornblende melagabbros and serpentinized peridotite (field term), to massive and sheared serpentinite containing isolated asbestos seams and veins. Structurally, the intrusion is complex with an intricate pattern of faults and shear joints. Slickensides are common and well developed. The ultramafic rocks within the thin fault zones are dynamically altered to chlorite schists, chlorite-sericite schists, or serpentine schists. Hydrothermal activity has locally resulted in intense silicification and carbonatization producing carbonate, silica-carbonate, and silica flooded zones. Some of the hydrothermally altered zones can resemble deformed, iron-rich, chemical sediments or chert-carbonate beds.

Mineralized zones are usually composed of fault-bound blocks and lenses of massive magnetite, sulphide-bearing massive magnetite (1% to 20% pyrrhotite and chalcopyrite), semi-massive to massive pyrrhotite with some chalcopyrite, and mineralized and sheared ultramafic rocks containing 5% to 50% pyrrhotite and chalcopyrite. Variable amounts of finely disseminated magnetite (1% to 10%) are present in most rock types and all sulphide-bearing zones. Analysis of 19 samples has returned values that range from 35.7% to 57% iron, 430 ppm to 2670 ppm copper, 50 to 650 ppm (1.30 pounds per ton) cobalt, 120 to 760 ppm nickel, and in one sample 1.06% zinc (assays by the Geoscience Laboratories, Ontario Geological Survey, Toronto).

Pattison-Roberts Prospect The Pattison-Roberts Prospect is located on Mining Locations R403, R404 and X212 in McCaul Township, near the southern bank of the Atikokan River, approximately 12 km east of Atikokan and 4.2 km west of Sapawe Lake.

This prospect was discovered circa 1882 as a direct result of the discovery of the Atikokan Iron Mine Deposit. In the period between 1890 and 1970, a total of 24 rock and overburden pits, trenches, and shallow shafts were excavated. In addition, exploration consisted of diamond drilling, roasting and metallurgical testing, and some ground geophysics.

The iron-copper-cobalt-nickel mineralization, similar to that of the Atikokan Iron Mine, is contained within a high, steep-sided, very erosion resistant, dike-like mass approximately 850 m long and up to 100 m wide. Rock types observed range from a fine-grained carbonate-chlorite schist to a predominant, sheared and serpentinized ultramafic rock tentatively termed a peridotite. Locally, seams of asbestos were observed, in larger quantities than at the Atikokan Iron Mine. Faults are numerous, but due to the poor exposure, their extent is unknown. Carbonate-chlorite schists and slickensides are the direct result of excessive shearing at the edges of the dike and also tend to characterized the smaller more localized subconcordant and cross-cutting faults. Carbonate stringers are common.

Magnetite, pyrrhotite, pyrite, and minor chalcopyrite, in amounts <2%, are very finely disseminated throughout the dike. Semi-massive to massive, possibly fault-bound, pods or lenses of magnetite are common near the southern edges of the dike and can contain 5% to 15% pyrrhotite, pyrite, and chalcopyrite. The eastern part of the dike contains tectonically banded, massive zones of pyrrhotite, up to 30 m thick, that locally contain 10% to 50% disseminated to semi-massive chalcopyrite and 1% to 15% very finely disseminated magnetite throughout. Assays of 17 samples returned values that range from 43.9% to 56.8% iron, 680 ppm to 2.7% copper, 490 ppm to 0.279% nickel, 114 ppm to 2380 ppm (4.76 pounds per ton) cobalt, and one sample that returned 4245 ppm titanium (assays by the Geoscience Laboratories, Ontario Geological Survey, Toronto).

Sheared and mylonitized clastic metasediments are present south of the dike. These rocks grade from moderately sheared turbiditic greywackes to highly sheared chlorite-quartz-sericite schists to biotite-sericite phyllonites. The phyllonites appear to be the most dynamically deformed rocks in this part of the Quetico Fault Zone and probably define the centre of the zone.

A relatively unmineralized, sheared, hornblende gabbro dike is located about 50 m north of the mineralized dike. It is fairly uniform in composition and contains about 1% to 2% finely disseminated pyrrhotite and chalcopyrite. The edge of the dike is highly sheared, carbonatized and silicified, and altered to quartz-carbonate-chlorite-sericite schist. This body does not appear to be a displaced part of the mineralized dike, and is probably a later, more fractionated intrusion.

2) The Quetico Intrusions

Intruded into the thin belt of metaturbidites that make up the northern Quetico Subprovince is a series of superficially similar mafic to ultramafic dikes, sills, plugs, and stocks. They occur within a 95 km long zone between McOuat Lake in the west and Lac des Mille Lacs in the east and range in size from 100 m by 30 m to over 850 m in diameter. Thirteen of these have been examined in the Atikokan area, two in detail. Lithologies include hornblende leucogabbro to hornblende melagabbros, feldspathic hornblendite, and hornblendite. Occasionally the larger intrusions contain zones of pyroxene hornblendite, hornblende pyroxenite, and pyroxenite. They are usually multiphased and appear to be roughly concentrically zoned. Textures range from fine to very coarse grained to pegmatitic. Cumulate layering has been observed locally. Detailed mapping and sampling have been completed on the Mud Lake and Abiwin Intrusions.

Mud Lake Intrusion The Mud Lake Intrusion is a comma-shaped sill-like body over 800 m long and between 10 and 100 m wide. It is located on the western shore of Mud Lake about 40 km east of Atikokan and 500 m south of Crooked Pine Lake. The intrusion has been mapped in detail for a distance of 350 m west of Mud Lake, covering the thickest and most highly mineralized part of the sill. This mafic to ultramafic body has been emplaced by two apparently separate intrusive episodes.

Initially, a modally layered ultramafic cumulate composed of discontinuous and disrupted, very coarse grained, oikocrystic hornblendites, feldspathic hornblendites, and porphyritic hornblende melagabbros was emplaced. After partial cooling, a fine- to coarse-grained, relatively massive, ophitic and sometimes pegmatitic hornblende gabbro to leucogabbro was intruded sub-concordantly on top of the ultramafic cumulate. The presence of very coarse grained gabbro pegmatite pods and veins throughout all rock types implies that later volatile-rich fluids moved along available pathways such as shears, fractures, and joints after the mafic and ultramafic rocks had at least partly cooled.

During, or possibly after the emplacement of the sill, regional amphibolite grade, dynamo-thermal metamorphism produced a quartz monzonite to granodiorite intrusive mobilizate by anatectic melting. In addition, sill emplacement produced a thin contact metamorphic aureole, 2 to 5 m wide in the surrounding turbiditic metasediments. Intrusion of the mobilizate formed a metasedimentary migmatite above the sill and in a few areas below the sill. Later the sill was folded and then faulted. Two major east-west faults have had their effect: one has dextrally offset the northern limb of the intrusion approximately 125 to 150 m to the east, while the other has produced an intense shear zone 30 to 50 m wide in the metasediments just south of the intrusion. The action of these two faults has produced, within the intrusion, a series of small scale right-lateral and left-lateral faults striking between 135° and 160° with offsets ranging between 0.10 m and 3 m.

The largest sulphide concentrations, usually of 2% to 20% finely disseminated pyrrhotite, chalcopyrite, and pyrite, occur in irregular pods, 5 to 10 m long and 2 to 5 m wide. Sulphide mineralization is also present in small patches of 1% to 5% finely disseminated pyrrhotite and chalcopyrite throughout all rocks types and as a fairly uniform, <1%, finely disseminated pyrrhotite and chalcopyrite in the hornblendite layers and in the ophitic hornblende leucogabbro mass. The gabbro pegmatites tend to concentrate sulphide mineralization and can contain up to 15% disseminated pyrrhotite and chalcopyrite. In addition, these pegmatites locally contain high percentages of scheelite ($CaWO_4$) in amounts approaching 10%. Scheelite was also observed in thin quartz-carbonate stringers in feldspathic hornblendite and porphyritic hornblende leucogabbro.

Assay results values range from trace to 3.45% copper, trace to 920 ppm nickel, trace to 0.27% tungsten, and one sample with 95 ppb platinum and 115 ppb palladium.

Abiwin Intrusion The Abiwin Intrusion is a small, highly deformed, dike-like body approximately 200 m long and between 20 and 40 m wide. It is located about 37 km east of Atikokan, 2.8 km northwest of Nydia Lake and on the north shore of a small unnamed lake. It is composed of slightly to highly altered medium to coarse-grained hornblende gabbro, hornblende melagabbro, feldspathic hornblendite, and hornblendite hosted by metasedimentary migmatites. The dynamic and thermal processes which have formed the migmatites have had a marked effect on the intrusion. By nature, the rocks composing the Abiwin Intrusion are very competent and tend to react brittley (fracturing and brecciation) to shear stress, while the metasediments react in a ductile manner (shearing). Thus, the formation of the migmatites has produced pull-apart structures within the dike, locally causing it to appear truncated faulted, rotated, or elongated.

Mineralization consists of numerous small, irregularly-shaped pods up to 10 m in length and 2 to 3 m in width and one larger pod nearly 40 m long and 10 m wide. The pods are contained within feldspathic hornblendite and hornblendite and are composed of 2% to 35% disseminated pyrrhotite, pyrite, and chalcopyrite. Analysis of polished thin sections have shown the existence of some very small discrete grains of some as yet unidentified platinum-group minerals, possibly sperrylite ($PtAs_2$) and merenskyite ($PdTe_2$). Assays indicate between 103 ppm and 2.20% copper, 116 ppm and 0.28% nickel, 50 ppm to 205 ppm cobalt, 30 ppm to 0.11 ounce per ton palladium, and 25 ppb to 1.15 ounces per ton platinum.

EXPLORATION GUIDELINES

The following guidelines might be useful in locating deposits that are associated with, or similar to, the two deposit types previously described.

Type 1 - The Atikokan River Intrusions: These iron-copper-nickel-cobalt-(asbestos) occurrences and deposits exhibit certain properties and associations which could facilitate discovery of similar bodies elsewhere:

a) They have an intimate association with intense well defined transform fault zones.

b) They are very resistant to erosion and tend to form high, very steep-sided linear ridges.

c) Due to their high magnetite content, they exhibit a significant and well defined magnetic signature.

d) Their high, conductive-sulphide content tends to produce good, linear, electromagnetic anomalies.

Type 2 - The Quetico Intrusions: These copper-nickel-platinum-palladium-(tungsten) occurrences are not as readily discernible as the "Type 1" deposits. However, they have three common or distinguishing features:

a) They occur as small isolated bodies within the relatively thin belt of turbiditic metasediments that comprises the northern part of the Quetico Subprovince.

b) They are slightly more erosion-resistant than the surrounding metasediments and occur as topographic highs.

c) They exhibit a distinctive, relatively isolated and intense, high magnetic anomaly with a flanking magnetic low. In some cases, this magnetic signature should be discernible even when the intrusion is mantled by a thin cover of metasedimentary rock.

Government geology and geophysical maps are available for the above-described areas.

SUMMARY

Cobalt, base-metal and platinum-group elements mineralization has been assigned to five "deposit types" based on lithology, structure, and associated sulphide mineralogy. Two of the five deposit types were examined in detail during the 1985 field season:

1. "The Atikokan River Intrusions" contain significant cobalt, copper, nickel mineralization closely associated with massive magnetite within highly sheared, structurally very complex, syntectonic, ultramafic intrusive rocks. A similar potential for cobalt and base metals may exist within other intrusions of this type.
2. "The Quetico Intrusions" are relatively small, mafic to ultramafic bodies exhibiting high, local concentrations of copper, nickel, cobalt, platinum, palladium and in at least one intrusion, tungsten mineralization. Base-metal and, in particular platinum-group element potential, is high in these and other similar bodies and should be investigated.

Work planned for 1986 will include geological mapping and sampling of one more Type 2 deposit, the Kawene Intrusion, and one example of each of the remaining deposit types which have not yet been examined in detail. Reconnaissance mapping and sampling for documentation purposes will continue, as will any property examinations requested by prospectors and mining companies.

HISTORICAL RESEARCH PROJECT

The Regional Mineral Resources Co-ordinator's Office continued its historical research project initiated in 1981. This project is an in-depth search of the old literature (mining journals, newspapers, magazines, government reports, etc.) for information on mineral occurrences and mining activities in the Thunder Bay Mining Division.

Each article is copied, referenced, and filed in the Mineral Deposits Files in the Resident Geologist's Office, Thunder Bay. In 1985, research was concentrated on: The Northern Miner, covering the time period from January 3, 1935 to December 28, 1939; and The Daily Journal (Fort William paper) covering the time period from January 10, 1894 to December 20, 1900.

RESULTS

1. Valuable information has been added to the files on documented and undocumented gold occurrences in the Atikokan, Beardmore-Geraldton, Shebandowan, and Schreiber-Terrace Bay areas. An example of an undocumented occurrence follows:

   Mr. James Hammond and a few other gentlemen have formed a company to be called the Kabaskong Gold Mining company. The company has acquired the south half of mining location 361X on Sawbill Lake (now Marmion Lake, north of Atikokan). The celebrated Hammond-Folger dyke or reef cuts through this location from the north-east towards the south-west. Several hundred feet of the reef on the company's property was uncovered late last fall and several test pits were sunk by it. The portion of the reef on the company's on the company's property appears to be about 2,000 feet in length by, in the neighborhood of, 200 feet in width . . . .

   An assay made on the 20th December, 1896, at the School of Mines, Kingston, of a general average of the rock taken from two test pits sunk on the reef on the company's land yielded $6.04 of gold and 20 cents of silver per ton. [The Daily Journal, Feb. 2, 1897]

   Reports from the Kabaskong Mine state that a discovery of a splendid quartz vein has been made on the reef. The vein is said to be five or six feet wide and from some of the ore which was panned by Mr. Hammond, it showed gold in a nice quantity, indicating that it is highly mineralized. [The Daily Journal, Mar. 13, 1897]

   A meeting of the directors of the Kabaskong Mining Company was held . . . . The report of Prof. Hille who examined the property was received with diagrams and maps showing the amount of work done and the result of his examination. The tunnel is now in 96 feet and the assays made by Prof. Hille gave the following results: $3, $10, $30, and $41. The first assay is the lowest, which was obtained. It came from the dyke and the highest from pit No. 4 in the north half which was down 16 feet at the time. The vein is 11 feet wide, but is lined on each side with broken schist and leaves a gangue of five or six feet carrying free gold and is highly mineralized. Prof. Hille estimates that the ore on the dyke can be mined and milled for $1.25 per ton and the lowest assay he got was $3.00 [The Daily Journal, Oct. 9, 1897]

2. Some articles contain glowing descriptions, but they should be checked out.

   Example 1:

   Fourteen years ago, Mr. Joe Weiden, of the Mission, discovered a rich vein of silver on the Payplat River, one-and-a-half miles from Lake Superior, one-and-a-quarter miles from the C.P.R.

> main line, and about midway between Rossport and Payplat siding.
>
> About three years ago, Mr. Weiden sold the controlling interest to John King, the enterprising general merchant of this place, and that gentleman has since that time had men doing a little prospecting on the property . . . .
>
> On that date, while prospecting, a vein was struck which for richness is equal to anything ever found in the district before, and the place where it was found was only about three or four hundred feet from the spot where Capt. Weiden had been prospecting for months and had only been able to find silver assaying from $10.00 to $25.00 to the ton.
>
> The vein where the big find was made is ten feet wide and may be followed for one half of a mile. It is a veritable wall of silver, from which huge chunks may be detached by the use of a common miner's pick, and it is estimated that no less than $800,000 worth of silver is in sight at this place.
>
> Capt. Weiden brought samples of the rock to Fort William, and Mr. Peter McKellar assayed them and found that they were sufficiently rich to reach the enormous figures of from $2,500 to $10,000 to the ton of native silver and a button of the precious metal, made from the samples for assay, was seen by a reporter. [The Daily Journal, Dec. 2, 1895]
>
> Mr. Joseph Weiden has sold his interests in location R570, 594, 576, 577 and 578, north of the Pays Plat Indian reserve to Mr. Jno King. [The Daily Journal, Nov. 17, 1896]

The above area was open for staking, as of December 11, 1985.

Example 2:

> Another property has now come to the front in Algoma in the Fire Mountain, known as 362X, which was discovered by Mr. W.H. Arnold about the middle of October and is situated 1 1/2 miles from northeast of Steel Lake siding, 160 miles east of Port Arthur. This property is something unusual in the mining discoveries of Algoma, as it appears to be nothing short of a gold quarry, one wall only being discovered yet, which is at the base of a mountain, the mountain formerly having no name, but was named by the discoverer. The quarry is one half mile long, following the mountain its entire length, and at present the ore is of a state formation, highly mineralized and carrying galena, copper and iron pyrites in good quantities. Assays have been made and they run from $1.50 to $40 per ton gold. [The Daily Journal, Dec. 5, 1896]

THUNDER BAY DRILL CORE LIBRARY by G.D. White and P. Hinz

Construction of the Thunder Bay Drill Core Library was initiated in May and completed in October of 1985. The official opening will take place in the spring of 1986. To date, approximately 30 400 m of core are stored in the facility (which has a capacity for about 137 000 m), with an additional 8500 m stored at three temporary sites in the field (Table 4.6). Flatbed trucks, that can hold approximately 5480 m of core, were used to transport the core from these temporary field locations to Thunder Bay. Core was obtained through voluntary donations and soliciting of companies active in the Thunder Bay Region. An up-to-date list of all companies and prospectors active in the area is maintained through contact with the Economic Geologist Programs, Ontario Geological Survey field geologists and through work permits and assessment data submitted to the Resident Geologist. Computer compilation of all data is in progress.

For the purpose of providing easy access to and cataloguing of core samples, the Thunder Bay Region has been divided into four areas: 1) West: Atikokan-Shebandowan, 2) East: Schreiber-Terrace Bay, 3) North: Beardmore-Geraldton, and 4) The Hemlo Area. This provides for easy access and cataloging of all core samples. It is hoped that this facility will be used by mining companies, prospectors, and academics for detailed follow-up studies, property acquisitions, and thesis work. Equipment required for core splitting, chemical testing, and microscopic examination are available at the Drill Core Library. Detailed files on logs, geochemical testing, and drillhole locations are maintained for all properties.

Unlogged drill core will be documented by Library staff and the data will be accessible to the public.

The Drill Core Library is presently staffed by G.D. White and Assistant, P. Hinz. All inquiries relating to the facility may be directed to: Drill Core Library, Ontario Ministry of Northern Development and Mines, Euclid Avenue, Thunder Bay, Ontario, P7C 5G6, or by calling (807) 475-1331.

BUILDING AND MONUMENT STONE by M.C. Kennedy and P.M. Gertzbein

INTRODUCTION

The "Building Stone Inventory" project was initiated in April 1984 to encourage the development of the dimension stone industry in the North Central Region. It is a two-year project funded jointly by the Federal and Provincial Government under the Northern Ontario Rural Development Agreement (NORDA), and is staffed by Myra Kennedy and Paul Gertzbein, Resource Geologists. The primary goals of the program are to identify areas and rock types having high potential for the production of good quality building and monument stone and to make information on all aspects of the stone industry available to the private sector.

Project activities have included identification and detailed documentation of occurrences of good quality stone as well as reconnaissance mapping in areas of high potential. Stone samples are cut and polished and are available for viewing at the Thunder Bay Resident Geologist's Office. Physical testing, chemical analysis, and petrographic work have been carried out on selected samples. Prospectors have received assistance in the form of property visits, sample preparation, information about the stone industry, and assistance making business contacts. The pro-

TABLE 4.6 DRILL CORE STORAGE, THUNDER BAY FACILITY

Area	Property	Company	Core Stored(m)
Atikokan-Shebandowan	Quetico-Lac des Mille Lac	Rio Algom Limited	4570
Beardmore-Geraldton	Crooked Green Creek Mine	Anglo-Canadian Mining Corporation	2285
Beardmore-Geraldton	Green Oaks Prospect	B. Miron	610
Beardmore-Geraldton	Lac des Iles	P. Sheridan	760
Beardmore-Geraldton	Leitch Gold Mine	Teck Corporation	610
Beardmore-Geraldton	Milestone-Tashota	Canamax Resources Incorporated	6705
Beardmore-Geraldton	Pichette Occurrence	Canamax Resources Incorporated	610
Beardmore-Geraldton	Prince Prospect	D. Thorsteinson	3750
Beardmore-Geraldton	Watson Lake Occurrence	Canamax Resources Incorporated	1340
Schreiber-Terrace Bay	Micham	Micham Exploration Incorporated	1830
Schreiber-Terrace Bay	Silver Sceptre	Silver Sceptre Resources Limited	1525
Hemlo Area	Battle	Battle Energy Corporation	760
Hemlo Area	Bel-Air	Bel-Air Resources Limited	2440
Hemlo Area	Dakota	Dakota Energy Corporation	610
Hemlo Area	Lenora-Argentex	Lenora Explorations Limited Argentex Resource Exploration Corporation	4575
Hemlo Area	Maple Leaf	Maple Leaf Petroleum Limited	760
Hemlo Area	Vulcan-Caulfield	Vulcan Resources Limited Caulfield Resources Limited	610
Hemlo Area	Westam-Ventex	Ingamar Exploration	760

BREAKDOWN BY AREA

WEST: Atikokan-Shebandowan	8 360 m
EAST: Schreiber-Terrace Bay	3 355 m
NORTH: Beardmore-Geraldton	16 670 m
Hemlo Area	10 515 m
Total Core Collected	38 900 m

ject has also involved promotion of stone from the area. Samples have been shown to stone producers in Minnesota and Quebec, and incorporated into a display of Ontario stone exhibited at the Canadian Wood Energy Institutes Trade Show in Toronto in June 1985. A display of Northwestern Ontario stone was presented at the Minnesota Society of the American Architects Association Annual Convention in Minneapolis in November 1985.

Renewed interest in stone from this area and increased activity in stone exploration is a result of this project. Several granite and sandstone properties have been staked. Interest has also been shown in decorative stone and crushed stone for the production of aggregate panels.

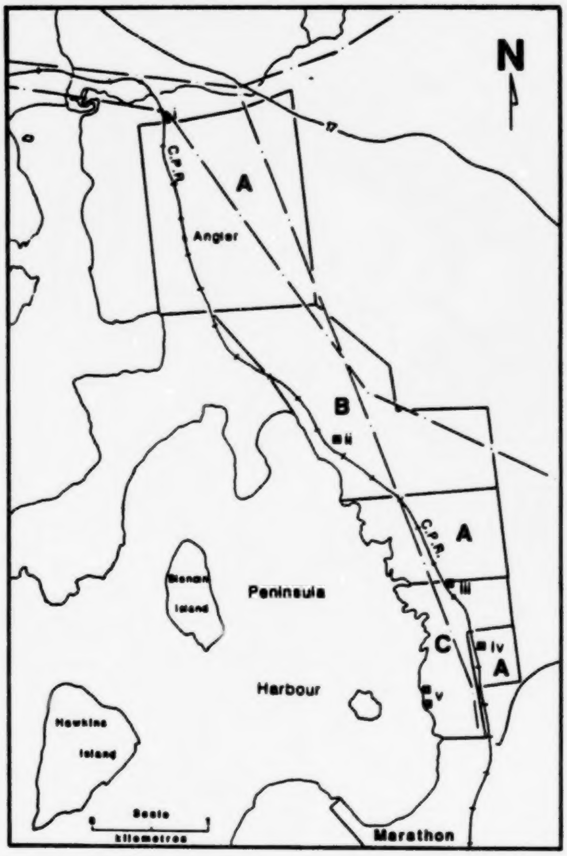
The reader should note that the terminology used in the stone industry differs from standard geological terminology. Terminology and geological criteria for stone deposits are described by M.C. Kennedy and P.M. Gertzbein *in* Patterson *et al.* (1985).

GRANITE

The area underlain by the Coldwell Alkaline Complex on the north shore of Lake Superior appears to have the greatest granite dimension stone potential in the North Central Region. In particular, the dark-coloured and red syenites of the complex are suitable for building and monumental purposes. The accessibility of parts of the complex by road, rail, and water is also a factor favouring this area.

The dark green-brown (black) augite-amphibole syenite (Currie 1980) covers a large area of the Coldwell Complex. This homogeneous, medium to coarse-grained rock was termed "laurvekite" by Puskas (1967). It is predominantly composed of alkali feldspar, pyroxene, and amphibole. The "barkevikite syenite" (Currie 1980) is a medium- to coarse-

Figure 4.6 . Dimension Stone Properties – Marathon Area



1985 PROPERTIES

- **(A) Noranda**
- **(B) D.Petrunka**
- **(C) James River-Marathon Ltd.**

LOCATION OF PAST PRODUCING QUARRIES

- i. Angler Quarry
- ii. Red Syenite Quarry (Peninsula G.Q. Co. 1929)
- iii. Augite Syenite Quarry (Coldspring 1930)
- iv. Augite Syenite Quarry (C.P.R. 1880's)
- v. Augite Syenite Quarry (Peninsula G.Q. Co. 1929)

grained intrusive rock, which is brown to red in colour. It is composed predominantly of alkali feldspar (commonly perthitic) and barkevikitic amphibole which can be seen as acicular grains in hand specimen. The area north of the town of Marathon is underlain by these two rock types and is the site of past dimension stone production. A number of the old quarries are located on Figure 4.6.

History

Black syenite was first quarried by the C.P.R. near Peninsula Station (now Marathon) in the 1880s for bridge construction. In 1927, Peninsula Granite Quarries Company began the first commercial quarrying in the area. The company held 17 claims along the C.P.R. and the shore of Lake Superior north of Peninsula Station. Quarrying of black and red syenite as carried out at several sites. The black granite property was sold to the Cold Spring Granite Company of Cold Spring, Minnesota in 1931, who operated a quarry for two years. During this period, a small amount of red and black syenite was also produced near Angler, 6 km north of Peninsula by Angler Granites Limited. Prospecting for granite near Middleton and Coldwell, to the west along the C.P.R., also took place at this time. In 1960, the Lake Superior Stone Syndicate staked 47 claims in the area with plans to begin quarrying. Failure to secure the necessary market for the stone resulted in the termination of the project (Puskas 1967).

Current Activity

Exploration activity for dimension stone in the area north of Marathon has been renewed in the past 18 months (*see* Figure 4.6 for current property ownership). Noranda Incorporated holds ground adjacent to the Angler quarry, the former Cold Spring quarry, and the old C.P.R. quarry. These are predominantly areas of "black granite" or augite syenite. The southern part of the Angler group of claims is underlain by red to brown syenite. Noranda Incorporated has carried out geological work on these claims. D. Petrunka staked a group of claims encompassing a "red" syenite body (actually brown) located south of Angler on which drilling is soon to begin. Three of the old quarries are located on patented ground owned by James River-Marathon Limited, the paper company in Marathon. Petrunka has also staked a group of claims on red syenite along the Trans-Canada Highway near the village of Coldwell, to the west of this area.

These properties possess characteristics that make them potential sources of building and monument stone. The dark and red syenites polish well, exhibiting attractive colours and textures. The dark green-brown syenite appears black when polished. The brown and red shades of the barkevikite syenite staked by Petrunka are very attractive when polished. Black, brown, and red coloured stones are currently in demand. Physical testing results indicate that the syenites meet A.S.T.M. (American Society of Testing and Materials) standards for granite dimension stone.

The Marathon area hosts a number of properties in which the rock appears to be structurally suitable for quarrying. Joints should be absent or widely spaced, and orthogonal to permit the extraction of large, straight-sided blocks. Several promising sites are located near former quarries in the area. In some cases, the former quarries are located in what the author would consider to be relatively poor areas. Past operations did not require blocks of the size which are desirable today (20 to 25 tons) and, therefore, stone was removed from areas with closer spaced jointing. Some of the most favourable areas for quarrying are: the site of the old C.P.R. quarry; the area just east of the old Cold Spring quarry; an area north of the Angler quarry between the powerline and Hare Creek; many parts of the red syenite body but particularly an area just south of the old Peninsula Granite Company quarry; and parts of the red-brown syenite south of the Angler quarry. The red syenite near Coldwell also appears to be suitable for quarrying. Jointing is widely spaced and sheets 4 to 5 m thick were observed.

SANDSTONE

The first dimension stone to be produced in the North Central Region was sandstone from Sibley Group sediments of Proterozoic age. Red- to brown-coloured sandstone of the Rossport Formation was quarried at Vert Island and La Grange Island in Nipigon Bay in the early to mid-1880s. Cream or buff-coloured sandstone of the Pass Lake Formation was quarried at Simpson Island, Quarry Island, and in the Wolf River area in the mid-1880s and early 1900s. Several buildings in the City of Thunder Bay were constructed of the sandstone from Vert Island and Simpson Island in the early 1900s. The present condition of the stone in these buildings attests to the durability and lasting beauty of these sandstones.

Vert Island Sandstone Quarry

Red sandstone was produced from Vert Island in Nipigon Bay of Lake Superior in the early 1880s by a Chicago company. The stone was shipped to Chicago and the mid-western U.S. until the mid-1880s when an import duty imposed on sandstone by the U.S. government made it uneconomical. The sandstone was used in 1885 in the construction of the C.P.R.'s Nipigon River bridge. The site lay idle until the early 1900s when Fort William and Port Arthur contractors removed previously quarried stone from the island for local building construction.

The quarry is located on the west shore of Vert Island on patented land. The site is overgrown but can be spotted by the presence of four stone rubble promontories which are the remnants of docks. The quarry face is approximately 225 m in length and averages 8 m in height. The stone along the length of the quarry appears to be of excellent quality. It is an attractive brick red colour and quite homogeneous in colour and texture. White reduction spots and streaks occur but do not seem to mar the appearance of the stone. Large blocks of stone could be extracted. Near-surface horizontal fractures are closely spaced but these widen to 1.5 to 2 m at a depth of about 2 m on most faces. Vertical joints are commonly 1.5 to 2 m apart.

The Vert Island sandstone used in local buildings is in very good condition showing little or no deterioration and none of the black discolouration which is common in red sandstones. The site could be an excellent source of sandstone ashlar as well as yielding large blocks for construction.

Simpson Island Sandstone Quarry

Buff-coloured sandstone was quarried on the north side of Simpson Island in Lake Superior in the early 1900s. The sandstone (quartzite) is predominantly thinly bedded, splitting into slabs 2.5 to 5 cm thick. Some sections would allow extraction of slabs 50 to 75 cm thick. The sandstone is exposed along the old quarry face which is 75 m in length and up to 14 m in height. The size of the deposit is difficult to estimate as the area is heavily tree covered. Near the quarry, the light-coloured unit is overlain by red pebbly sandstone. There may be about 30 m of the light-coloured sandstone above water level. It is exposed for a short distance to the west of the quarry. Overburden covers this unit to the east although it is found at other locations on the north shore of Simpson Island (Giguere 1975).

The property was staked in May, 1985, by W. Seeber of Thunder Bay, who is examining the feasibility of producing sandstone flagging and ashlar from the site. Seeber is also examining the silica potential of the sandstone in this area and has staked a past-producing property on Quarry Island near Rossport. A sample of the Quarry Island sandstone, sent for analysis by the author to the Geoscience Laboratories, Ontario Geological Survey, Toronto, contained 99.0% SiO_2. Seeber is conducting further analysis.

ORNAMENTAL STONE

"Marble" in the Thunder Bay area occurs as a carbonate-rich part of the Sibley Group, in a variety of colours and is particularly suitable for ornamental purposes. The LunMac "marble" property located near Eaglehead Lake has been described in detail by Redden (1980, Assessment Files of the Resident Geologist office, Ontario Ministry of Northern Development and Mines, Thunder Bay), Fenwick and Scott (1977), and Patterson *et al.* (1985). The "marble" is multi-coloured (grey, white, brown, green) but the predominant unit is a 3 m thick layer of blue-grey stromatolitic dolomite. The stromatolitic unit makes particularly distinctive ornamental stone and is available in some quantity. H. Lundmark and W. McAteer make ornamental objects (clocks, pen sets, etc.) of the marble which are sold locally. The marble has also been used for decorative flooring and wall facing.

Pink to coral-coloured marble is found near Ouimet at the former site of the Black Bay Mine and Quarry Company (1880s) and layered, green marble occurs near Muskrat Lake.

Amethyst breccia from amethyst-producing properties in the Thunder Bay area makes attractive stone for decorative wall facing and fireplaces.

Several other locations demonstrate potential for decorative stone deposits. These include the dolomite breccia found at the Steeprock Iron Mine, graphic granite found north of Thunder Bay on Highway

527, and red stromatolitic jasper found at Mink Mountain.

RECOMMENDATIONS

A number of potential stone deposits have been located in the Coldwell Complex. There remain areas of the complex to be examined which also have good potential. Some of the other rock units (e.g. nepheline syenite) should be examined for their suitability.

Other granitic intrusions also make good exploration targets for dimension stone. Examples include the Eva Lake Stock near Atikokan and the Barnum and Trout Lake plutons north of Thunder Bay. The sandstone property on Vert Island should be considered as a potential producing site. The author has received numerous inquiries about red sandstone both for new construction and for restoration work. La Grange Island in Nipigon Bay which is Crown land should also be examined as a source of red sandstone. Good quality red sandstone is in short supply.

"Marble" (limestone) has been described at a number of localities in the Black Sturgeon River area by Coates (1972). Some of these sites may warrant investigation as sources of decorative stone.

QUATERNARY GEOLOGY by F.J. Kristjansson

MANITOUWADGE AREA

A program designed to provide detailed surficial geological mapping at a scale of 1:50 000 of the Manitouwadge map area (42F4) has been completed. A phased approach was used to organize the project (i.e., Step I: Data Collection and Review. Step II: Field Reconnaissance (83 and 85 field seasons), and Step III: Map Production). The study began with a literature search and review. Conventional aerial photography at 1 inch to 1 mile and 1 inch to 1/4 mile scales was obtained. A preliminary aerial photograph interpretation was conducted. During the second phase of the project, which required two field seasons to complete, all preliminary interpretation was subjected to a program of field verification. The surficial geology of the west one-half of the map sheet was documented during the 1983 field season. The east one-half of the map sheet was mapped during the 1985 field season. The objective was to obtain as many points of ground truth in the study area as possible. Navigable roads were traversed by vehicle, and all sand and gravel pits, and borrow pits, were visited. Detailed ground truth of the geomorphology and surficial geology of the Manitouwadge area was obtained. A preliminary map depicting the Quaternary Geology of the Manitouwadge area has been prepared.

GEOLOGICAL RESEARCH IN THE NORTH CENTRAL REGION

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Details of research carried out by the Ontario Geological Survey are given in Wood *et al.* (1985). A summary of these programs is listed below: T.L. Muir, A Map of Hemlo Deposit; G.M. Siragusa, Geology of the Black River Area; B. Geddes, Quaternary Mapping in the Hemlo Area; M.W. Carter, Geology of Conmee, Forbes and a Portion of the Dawson Road Lots; L. Chorlton and G.H. Brown, Geological Setting of Gold Mineralization at Shebandowan; S.J. Buck and H.R. Williams, The Nature of the Quetico-Wabigoon Contact Near Longlac; R. Sutcliffe, Geology of the Lake des Iles Area; J. Macdonald, Platinum-Palladium Mineralization of the Lac des Iles Area.

Table 4.7 lists maps and reports published during the year by the Ontario Geological Survey, Ontario Ministry of Northern Development and Mines, Toronto.

RESEARCH BY OTHER ORGANIZATIONS

Geological Survey of Canada

Activity by the Geological Survey of Canada included a regional geological compilation of Northwestern Ontario, emphasizing the granitic terrains by J. Percival. I. Cameron and K. Hattori are carrying out a number of isotope geology studies in the Hemlo area. P. Harris is carrying out detailed mineralogical studies in the Hemlo area.

Lakehead University

B.Sc. Theses Completed in 1985

Alford, C.

Structure Analysis of Multiply Deformed Metasedimentary and Metavolcanic Strata in the Mawn Lake Area.

Gliddon, D.J.

Chemical Sedimentation and Depositional Environment of Barite and Associated Chemical and Clastic Sediments Near Hemlo, Ontario.

Harvey, P.G.

Lateral Secretion at the Rabbit Mountain Mine, Mainland Belt Silver Region, Thunder Bay District.

Martin, A.

Structural Analysis of Multiply Deformed Metasedimentary and Metavolcanic Strata in the Max Lake Area.

O'Brien, M.

Volcanics of the Poplar Lodge Area, Beardmore, Ontario.

Schuster, R.A.

Depositional Setting and Landform Evolution Depicted by Pleistocene to Recent Sediments North of Thunder Bay, Ontario.

Scott, B.M.

Alteration Surrounding Gold-Bearing Quartz-Carbonate Veins in Clastic Hosted Banded Iron Formation, Jellicoe-Geraldton Area, Ontario.

Sinclair, T.J.

Alteration Surrounding Gold-Bearing Quartz-Carbonate Veins in Volcanic Hosted Banded Iron Formation, Jellicoe, Ontario.

Simunovic, A.

TABLE 4.7 MAPS AND REPORTS PERTAINING TO THE NORTH CENTRAL REGION PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports
OFR 5534
OFR 5538
OFR 5539
OFR 5561
OFR 5566
Open File Maps
OFM 6
OFM 7
OFM 9
OFM 11
OFM 17
OFM 26
OFM 27
OFM 28
Preliminary Maps
P.2738
P.2739
P.2828
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P.2853
P.2854
P.2855
P.2856
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2464
2467
2472
Geological Data Inventory Folios
GDIF 202
GDIF 203
GDIF 204
GDIF 205
GDIF 206
GDIF 207
GDIF 208
Mineral Resources Branch Publications
MPBP 18
MPBP 19
MPBP 20
IMBP 6

TABLE 4.7 Continued

Miscellaneous Reports
MP 77
MP 122
MP 125
MP 126
MP 127
Study Series
Study 44
Aggregate Resources Inventory Paper
ARIP 124
Geochemical Series
MAP 80755

Strain Analysis of Clastic Sedimentary Rocks and Pillow Lavas from the Wabigoon Sub-province in the Vicinity of Max Lake.

M.Sc. Theses (in progress)

Devaney, J.R.

Depositional Environment of Coarse Clastics in the Archean Beardmore-Geraldton Sedimentary Belt, Ontario.

Jennings, E.A.

Fluid Geothermometry of Silver Vein Deposits of the Thunder Bay Area, Northwestern Ontario.

Laderoute, D.

Petrology and Geochemistry of Lamprophyres and Other Dike Rocks from the Coldwell Complex.

Lukosius-Sander, Y.

Geology of Centre 3, Coldwell Complex.

MacTavish, A.D.

Geology and Petrochemistry of Quetico Mafic-Ultramafic Intrusions.

Riley, B.

Paint Lake Fault Geology, Brock University.

Sarvais, P.

Anisotropism in the Quetico Fault.

Schnieders, B.R.

Geology, Structure and Depositional Environment of Chemical and Clastic Sediments in the Steel River Area, Terrace Bay, Ontario.

Thomson, K.

Depositional Setting of Chemical and Clastic Sediments in the Greenstone Belt Between Marathon and White River.

M.Sc. Theses Completed

Brown, G.H.

Structure and Stratigraphy of Timiskaming Rocks in the Shebandowan-Shabaqua-Finmark-Lappe Areas.

Zayachkivsky, B.

Geochemistry and Mineralogy of Rare-Element Pegmatites in the Georgia Lake Area, Northwestern, Ontario.

Other Staff Research Activities

Borradaile, G.J.

(1) Structure of the Margins of the Quetico and Wabigoon "Belts", especially between Atikokan and Mine Centre.

(2) Structure and Strain Analysis of Greenstone Wedges in the Wabigoon Sub-province.

(3) Strain and Magnetic Anisotropy of Archean Metasedimentary Rocks, Especially Seine River Sequence.

(4) Rock Mechanics Testing and Seismic Anisotrophy of Plutonic Archean Rocks to 3 kb and 300°C With/Without Pore Fluid Pressures.

Fralick, P.W.

The Depositional Environment of Oxide and Sulfide Facies Algoman Banded Iron Formation.

Hale, C.J., and Steward, J.D.

Petrography and Paleomagmatism of the Gunflint Formation with Reference to Paleo-Indian Artifacts.

Kehlenbeck, M.M.

(1) Character of the Quetico-Wabigoon Boundary Zone in the Beardmore-Geraldton-Longlac Area.

(2) Deformation of Non-Spherical Objects in Rocks from the Jellicoe-Geraldton Area.

(3) Progressive Deformation and Fold Evolution in Metasedimentary Rocks of the Quetico-Wabigoon Boundary Zone.

(4) Progressive Inhomogeneous Simple Shear and Uniform Homogeneous Strain as Related to Folds in the Beardmore-Geraldton Boundary Zone.

Kissin, S.A.

Diagenetic Reactions in the Gunflint Formation.

Liquid Immiscibility in the Logan Diabase Sills, Northwestern Ontario.

Mitchell, R.H.

Petrology and Geochemistry of the Coldwell Complex.

Other Universities

Bajc, A.

History and Development of the Pro-Glacial Lake Deposits in the Black River Area, University of Waterloo.

Barnett, B.

Geology of the Williams Deposit, Hemlo, Ontario, Ph.D. Thesis, University of Western Ontario.

Bree, D.G.

Investigation Into the Nature of Gold in Humus and its Significance to Geochemical Exploration, Hemlo, Ontario, Queen's University.

Burke, R.

The Geology of Corona Deposit, Hemlo, Ontario, M.Sc. Thesis, Queen's University.

Carigan, B.

Isotopic Composition of the Gunflint Rocks, M.Sc. Thesis, University of Ottawa.

Cheadle, B.

Stratigraphy of Sibley Group Rocks, Thunder Bay, Ontario, Queen's University.

Cogulu, E.

Petrology of Great Lake Nickel Deposit, University of Ottawa.

Cohen, D.R.

Biogeochemistry, A Geochemical Method for Gold Exploration, Hemlo, Ontario, Queen's University.

Goad, R.

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Hugon, M.

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Osterberg, S.

Massive Sulphide Deposits in the Onaman River Area, University of Minnesota at Duluth.

Peterson, E.U.

Metamorphism and Geochemistry of the GECO Massive Sulfide Deposit and it Enclosing Wall-Rocks, Ph.D. Thesis, University of Michigan.

Shelp, G.S.

The Nature of Gold in Glacial Sediments and Soils Associated with the Mineralization, Hemlo, Ontario, Queen's University.

Wilks, M.

The Geology of the Marmion Lake Batholith, M.Sc. Thesis, University of Saskatoon.

Woods, E.

Relationship of Quaternary Sediment to Lake Water Acidity, Hemlo Area, B.Sc. Thesis, University of Western Ontario.

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5. North Clay Belt and Lowland Resident Geologist Area, Northern Region

W.O. Mackasey[1] **and M.C. Digby**[2]

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INTRODUCTION

A new Resident Geologist District was formed in April 1985. This area is composed of two parts. The first part consists of the North Clay Belt, and extends from the Quebec Border and Detour Lake west to include Cochrane, Kapuskasing, and Hearst. The second part consists of the James Bay and Hudson Bay Lowlands.

The office is staffed by W.O. Mackasey, Resident Geologist, and M.C. Digby, Contract Geologist. Office quarters are shared with the Timmins Resident Geologist, and support services are provided by D. Draper, Data Geologist, and Diane Egerland, Secretary.

Much of the field season was spent gaining familiarity with the geology, mineral deposits, and accessibility of the area. Up-to-date road maps and logistical information were provided by the Cochrane, Kapuskasing, and Hearst Ministry of Natural Resources District Offices.

CLAIM STAKING ACTIVITY

A total of 778 claims were staked in the North Clay Belt and Lowland Area from January 1, 1985, to December 1985. As of December 1985, 6846 active claims are held in the area. Areas of active claim staking in 1985 include the Detour Lake area and McCowan, Fergus, and Ecclestone Townships.

EXPLORATORY LICENCES OF OCCUPATION

In the past few years, three companies have held exploratory licences of occupation in the Moose River Basin.

During 1985, two of the licences expired. The Douglas-Taylor Joint Venture licence, which had covered an area of 10 400 acres in the Kipling Township area, was not renewed. The licence granted to B.P. Exploration Canada Limited, covering 7200 acres, expired September 1, 1985.

The Onexco Minerals Limited exploratory licence was maintained at 150 000 acres during 1985.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

As of November 12, 1985, seven Ontario Mineral Exploration Program grants have been awarded to assist exploration programs in the North Clay Belt and Lowland area during 1985. A total of $794 846 has been committed as OMEP's share of exploration costs. Planned exploration expenditures for the seven grants amounts to $3 179 381.

DRILL CORE LIBRARY PROGRAM

Drill core for the area is stored in the Porcupine Mining Division Drill Core Library in Timmins. Over 13 252 m of core representing 23 734 m of drilling is currently available for public inspection. Table 5.1 and Figures 5.1 and 5.2 give details on the core collection.

Core from some of the deep oil and gas test wells drilled in the Lowland area is currently stored in the Ministry of Natural Resources, London, Ontario, core storage facility.

PROSPECTING CLASSES

Staff from the Timmins office presented ten-hour basic introductory prospecting courses during March and April in Kapuskasing and Hearst. Emphasis was on rock and mineral identification, prospecting techniques, and claim staking.

The course in Kapuskasing was sponsored by Northern College and 25 participants were enrolled. Thirty-one participants attended the classes in Hearst. The course in this locality had been arranged by the Hearst Ministry of Natural Resources District Office.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

In 1985, there were three projects undertaken by the Ontario Geological Survey in the North Clay Belt and Lowland Resident Geologist area.

ENGINEERING AND TERRAIN GEOLOGY SECTION

A 321 m borehole was completed during March 1985, in Morrow Township to gain information on the stratigraphy of the eastern part of the Moose River Basin. The hole was collared approximately 5 km west of the Onakawana railway siding.

The drilling was able to confirm that the Long Rapids Formation is anomalously thick in the Onakawana area. A 1.5 m lignite seam was intersected at the base of the Mattagami Formation (Sanderson and Telford 1985).

The core from this hole is stored at the Drill Core Library in Timmins.

MINERAL DEPOSITS SECTION

A second field season was completed by Soussan Marmont on the study of the Detour Lake Mine Area. This included underground mapping and mapping of surface geology beyond the mine site. Detailed mapping of the underground workings provided new information on the geological features of the gold deposit. Late Archean deformation associated with gold mineralization is described by Marmont (1985).

TABLE 5.1 CORE STORED AT DRILL CORE LIBRARY, TIMMINS ONTARIO

AREA/ TOWNSHIP	COMPANY	YEAR DRILLED	# HOLES	TOTAL DEPTH (M)	CORE STORED (M)
Adanac	Gowest Amalgamated Res. L.	1983	2	350.3	334.7
Alexandra	Mattagami Lake Mines	1980/81	4	523.1	190.1
Atkinson Lake	Dome-Chevron J.V.	1982	2	172.6	104.3
Atkinson Lake	Noranda Expl. Co. L.	1979	1	115.5	4.8
Auden	Shell Canada Res. L.	1978	3	285.2	206.0
Bradley	Zaychuk, G. Prop.	1977	2	63.4	0.6
Burrell	Shell Canada Res. L.	1978	1	122.3	95.1
Burstall	Ontario Geological Survey	1984	1	45.0	14.6
Byng	Noranda-Canamax J.V.	1983	1	102.4	81.7
Byrnes Lake	Ontario Geological Survey	1984	1	125.0	30.6
Cargill	Continental Copper Mine L.	1956	5	855.1	0.5
Clute	Shell Canada Res. L.	1977	2	202.2	135.4
Cumming	Coniagas Mines L.	1954	4	378.1	0.6
Dunsmore	Ontario Geological Survey	1983	1	101.0	87.2
E. of Martison Lake	Ontario Geological Survey	1984	1	124.0	32.2
E. of Mistukwia	Ontario Geological Survey	1983	1	122.0	81.7
Fintry	Shell Canada Res. L.	1978	4	513.6	434.7
Ford	Midray Minerals L.	1964	4	453.3	1.7
Fushimi	Noranda Expl. Co. L.	1984	1	196.9	175.6
Glackmeyer	Shell Canada Res. L.	1977	1	124.1	71.6
Guilfoyle	Shell Canada Res. L.	1978	10	1264.3	983.5
Hopkins	Shell Canada Res. L.	1978	2	272.5	220.4
Hopper Lake	Genesis Res. Inc.	1984	3	589.2	91.8
Hopper Lake	Newmont Exp. Can.	1983	1	76.2	62.8
Hopper Lake	Noranda Expl. Co. L.	1977/78	6	619.0	57.5
Hopper Lake	Trojan Energy Corp.	1983	4	838.9	120.1
Hurdman	Mattagami Lake Mines L.	1980/81	29	3180.8	1120.8
Idington	Shell Canada Res. L.	1979	1	108.8	99.0
Kingrey Lake	Dome-Chevron J.V.	1982	1	87.2	75.0
Kwataboahegan River	Ontario Geological Survey	1984	1	103.0	64.9
Legge	Noranda-Canamax J.V.	1983	1	59.7	39.0
Leitch	Shell Canada Res. L.	1977	7	756.0	599.8
Lowakamistik River	Noranda Expl. Co. L.	1984	1	97.2	22.6
Lower Detour	Noranda Expl. Co. L.	1977	4	547.4	86.1
Madawau Creek	Ontario Geological Survey	1983	2	287.0	156.1
Martison Lake	Ontario Geological Survey	1984	1	86.0	82.0
McBrien	Ontario Geological Survey	1984	1	197.0	72.5
McCoig	Shell Canada Res. L.	1978	2	312.3	245.9
McCrea	Shell Canada Res. L.	1979	1	77.7	38.1
McCuaig	Ontario Geological Survey	1983	1	101.0	44.2
Minnipuka	Amax Minerals Expl.	1981	5	479.1	427.1
Mulloy	Shell Canada Res. L.	1978	1	102.3	83.7
N. of Chabbie L.	Dome-Chevron J.V.	1982	2	247.5	234.7
N. of Mahoney Twp.	Ontario Geological Survey	1983	1	146.0	83.5
N. of Martison L.	Ontario Geological Survey	1984	1	70.0	15.2
N. of Pivabiska	Ontario Geological Survey	1984	1	18.0	15.5
Pitopiko River	Shell Canada Res. L.	1978	1	173.9	125.0
Potter	Shell Canada Res. L.	1976	7	1172.2	1095.4
Puskuta	Noranda-Canamax J.V.	1983	6	722.4	684.3
Rowlandson	Shell Canada Res. L.	1978	8	984.2	738.4
S. of Kwatahoah	Ontario Geological Survey	1984	1	118.0	17.4
S. of Ridge Lake	Ontario Geological Survey	1984	1	38.0	36.9
Schlievert Lake	Ontario Geological Survey	1983	1	625.0	612.6
Teetzel	Shell Canada Res. L.	1978/79	5	406.4	348.2
Three Portage Rapids	Shell Canada Res. L.	1978	1	126.3	94.6
W. of Ridge Lake	Ontario Geological Survey	1984	1	70.0	70.0
W. of Sunday Lake	Global Energy Corp.	1983	7	999.0	183.6
W. of Sunday Lake	Newmont Expl. Can.	1982/83	13	1552.6	1370.8
Walls	Amax Minerals Expl.	1981	7	705.0	605.7
Weichel	Shell Canada Res. L.	1978	1	68.9	15.9
Williamson	Shell Canada Res. L.	1979	3	272.8	231.0
				23,733.9	13,455.3

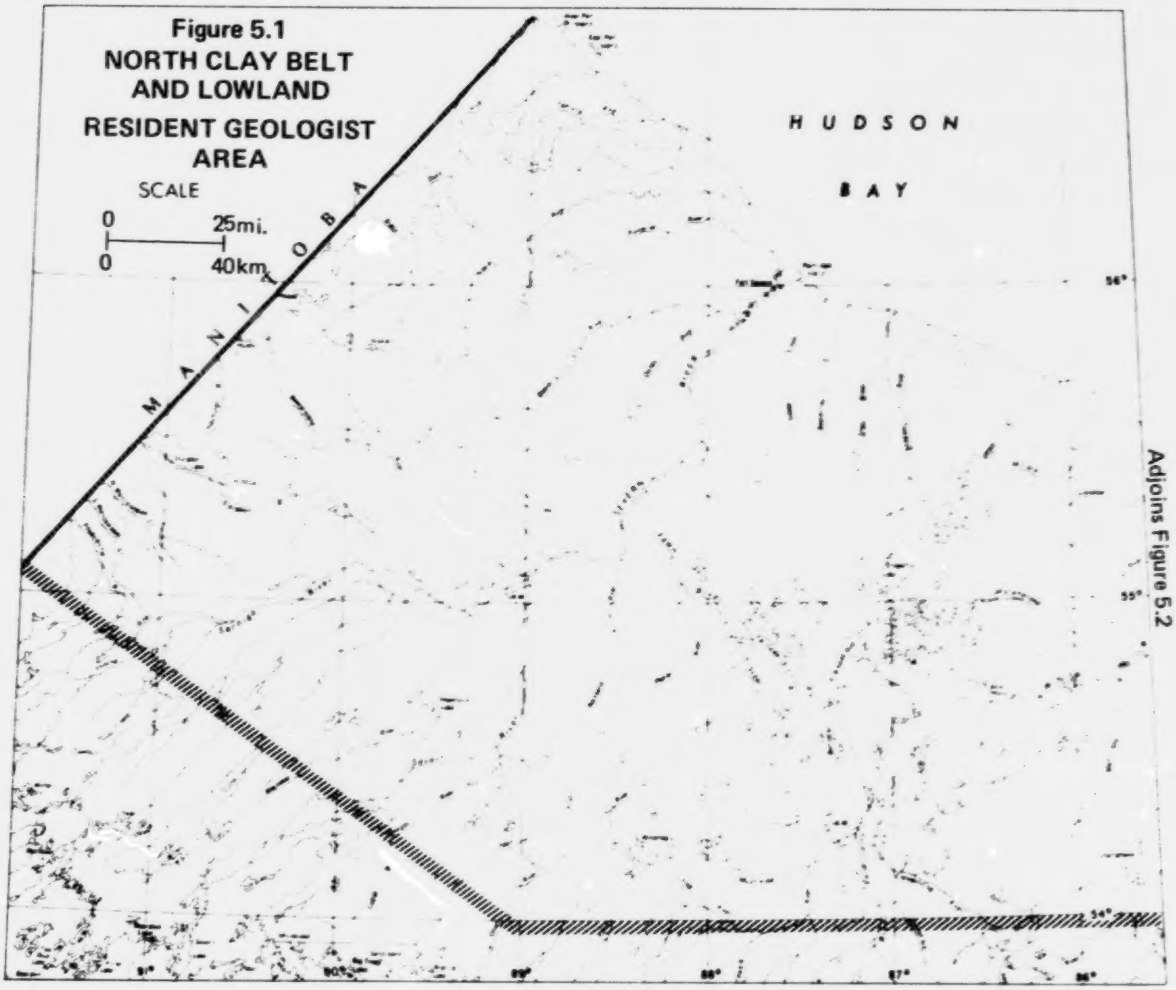


Figure 5.1
NORTH CLAY BELT AND LOWLAND
RESIDENT GEOLOGIST AREA

SCALE
0 25mi.
0 40km
MANITOBA
HUDSON
BAY
56°
55°
54°
91°
90°
89°
88°
87°
86°
Adjoins Figure 5.2

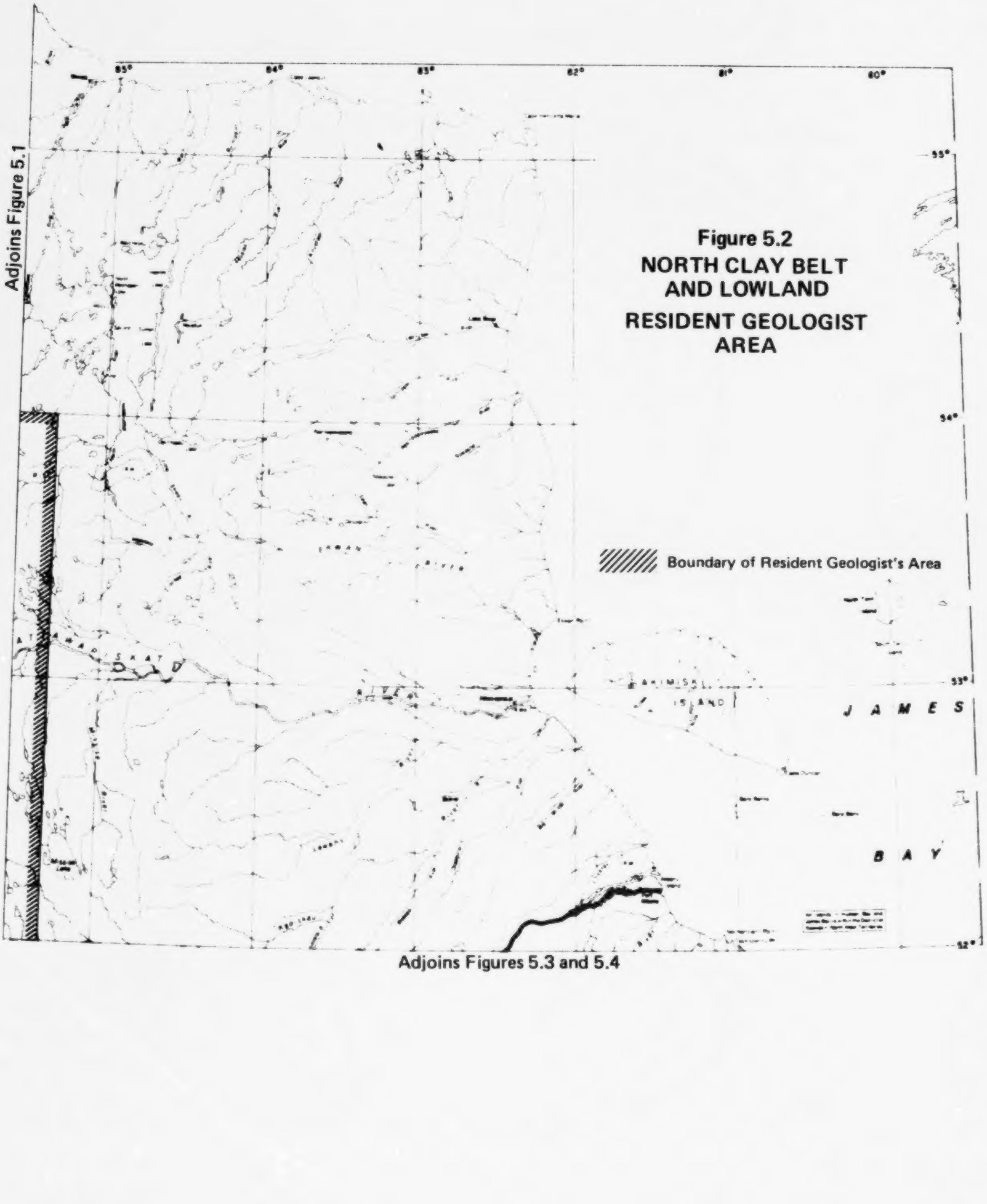

Adjoins Figure 5.1
85°
84°
83°
82°
81°
80°
55°
54°
53°
52°
Boundary of Resident Geologist's Area
ATTAWAPISKAT
RIVER
AKIMISKI
ISLAND
JAMES
BAY
Adjoins Figures 5.3 and 5.4

Figure 5.2
NORTH CLAY BELT
AND LOWLAND
RESIDENT GEOLOGIST
AREA

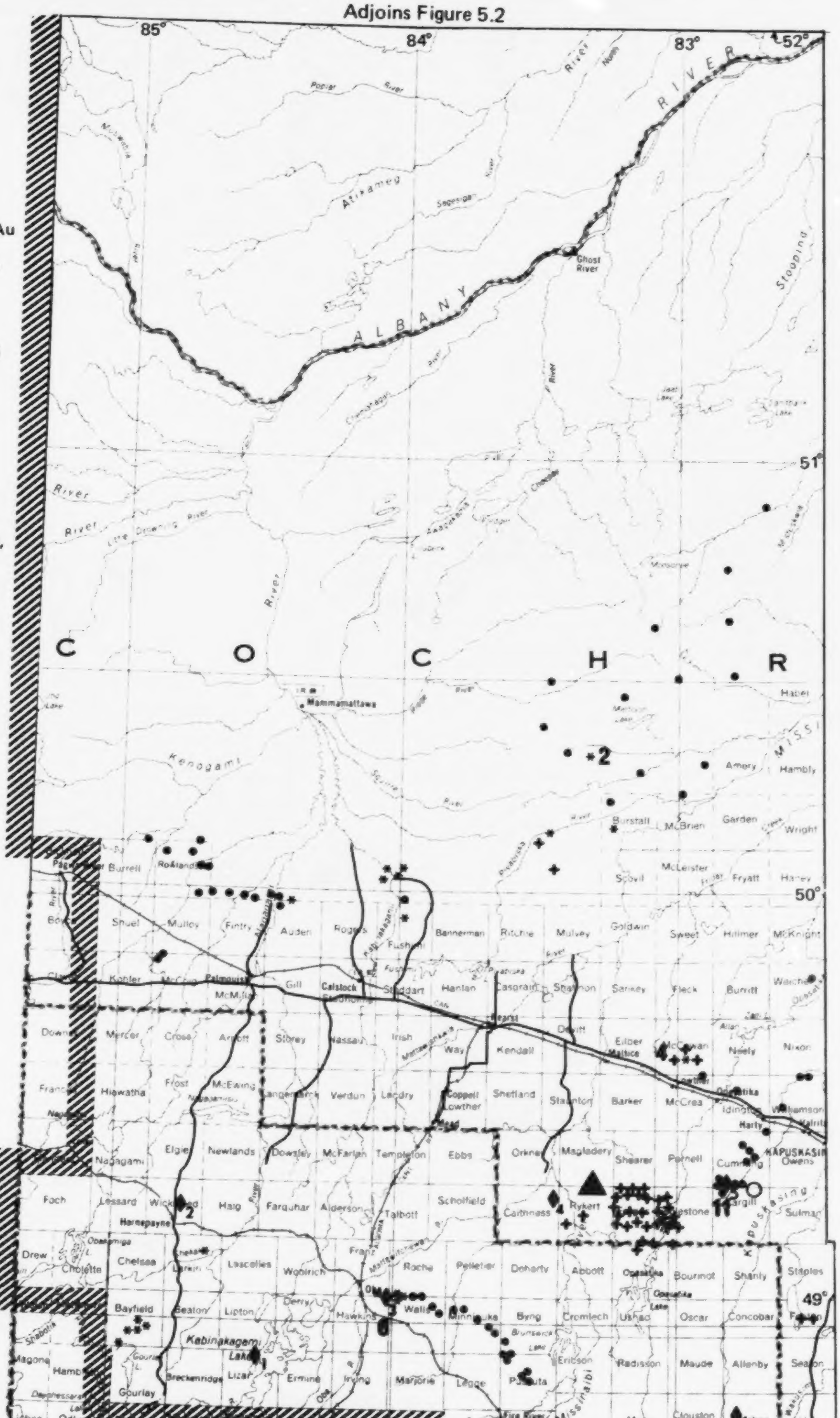
Figure 5.3
NORTH CLAY BELT AND LOWLAND
RESIDENT GEOLOGIST AREA

- ● Detour Lake Mine. . . . . Au
- ○ Properties Under Major Evaluation
- ◆9 Property and Field Visits see TABLE
- * Assessment Work Submitted, 1985
- + Claims Staked, 1985 (symbol represents approximately 20
- 11 Exploration Activity, 1985 see TABLE
- • Drill Core Available For Viewing, 1985
- ▲ Ontario Geological Survey Projects, 1985

SCALE

0 — 25 mi.

0 — 20 — 40 km



Adjoins Figure 5.2
85°
84°
83°
52°
51°
50°
49°
ALBANY RIVER
Ghost River
Poplar River
Atikameg
Sagesiga River
North River
Stooping
River
Little Current River
Mammamattawa
Kenogami
Squirrel River
Missinaibi
C O C H R
2
Burrell
Rollands
Shuel
Mulloy
Fintry
Auden
Rogers
Fushimi
Bannerman
Ritchie
Mulvey
Goldwin
Sweet
Hillmer
McKnight
Habel
Amery
Hambly
Burstall
McBrien
Garden
Wright
Scovil
McLeister
Fryatt
Haney
Kobler
McCowan
Pagwa River
McMillan
Gill
Calstock
Stoddart
Hanlan
Casgrain
Shannon
Sankey
Fleck
Burritt
Walcheck
Hearst
Devitt
Elliott
Downer
Mercer
Cross
Arnott
Storey
Nassau
Irish
Way
Kendall
Eilber
Mattice
Neely
Nixon
Franz
Hiawatha
Frost
McEwing
Langemarck
Verdun
Landry
Coppell
Lowther
Shetland
Stainton
Barker
McCrea
Opasatika
Idington
Williamson
Kalrite
Harty
Nagagami
Elgie
Newlands
Dowsley
McFarlan
Templeton
Ebbs
Orkney
Magladery
Shearer
Pernell
Cumming
KAPUSKASING
Owens
Foch
Lessard
Wicksteed
Haig
Farquhar
Alderson
Talbott
Scholfield
Caithness
Rykert
Gurney
Sulman
Hornepayne
Drew
Choate
Chelsea
Lascelles
Woolrich
Roche
Pelletier
Doherty
Abbott
Opasatika Lake
Bourinot
Shanly
Staples
Fauquier
Bayfield
Beaton
Lipton
Derry
Hawkins
Wallis
Minnipuka
Byng
Cromlech
Usher
Oscar
Concobar
Kabinakagami Lake
Breckenridge
Lizar
Ermine
Irving
Marjorie
Legge
Ericson
Radisson
Maude
Allenby
Seaton
Hambleton
Gourlay
Johns
Odlum
Strickland
Carney
Martin
Mildred
Hook
Heyward
Fire River
Champlain
Mons
Clouston
Lisgar
Common
Tedder
Oba Lake
Amundsen
Davin
Wadsworth
Kapuskasing River
Missinaibi Lake
11
4
6

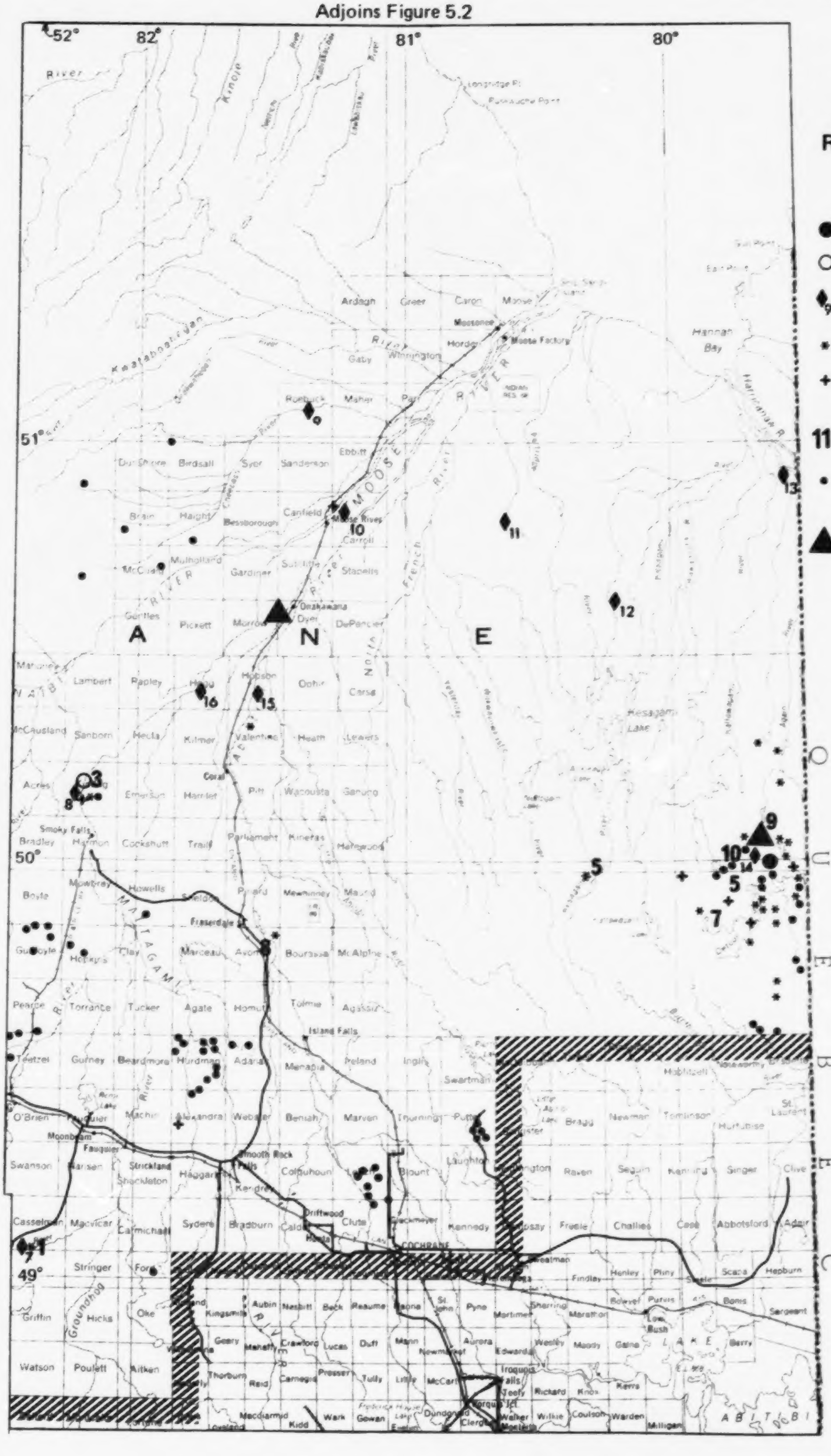

Adjoins Figure 5.2
52°
82°
81°
80°
51°
50°
49°
Moosonee
Moose Factory
Moose River
Hannah Bay
Smoky Falls
Fraserdale
Island Falls
Smooth Rock Falls
COCHRANE
Iroquois Falls
Kesagami Lake
LAKE ABITIBI
A N N E
Q U E B E C
1
3
5
7
8
9
10
11
12
13
14
15
16

Figure 5.4
NORTH CLAY BELT AND LOWLAND
RESIDENT GEOLOGIST AREA

● Detour Lake Mine. . . . . Au
○ Properties Under Major Evaluation
♦9 Property and Field Visits see TABLE
* Assessment Work Submitted, 1985
+ Claims Staked, 1985 (symbol represents approximately 20 claims)
11 Exploration Activity, 1985 see TABLE
• Drill Core Available For Viewing, 1985
▲ Ontario Geological Survey Projects, 1985
SCALE
0 25 mi.
0 20 40 km

TABLE 5.2 . MAPS AND REPORTS PERTAINING TO THE NORTH CLAY BELT AND LOWLAND RESIDENT GEOLOGIST AREA PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY ,MINISTRY OF NORTHERN DEVELOPMENT AND MINES

OPEN FILE REPORTS	
OFR 5567	Peatland Resource Inventory Northwest of Timmins
OFR 5563	The Schlievert Lake Borehole Report
OFR 5545	Palynostratigraphy of Lignite, Adam Creek, Moose River Basin
MISCELLANEOUS PAPERS	
MP 122	Report of Activities 1984 Regional and Resident Geologists
MP 126	Summary of Field Work, 1985
MP 127	Geoscience Research Grant Program, Summary of Research 1984-1985

PRECAMBRIAN GEOLOGY SECTION

A 1075 km^2 area was mapped south of Hearst and Kapuskasing during the 1985 field season. The map area included Caithness, Rykert, Fergus, and Ecclestone Townships and parts of Scholfield, Pelletier, Doherty, Abbott, Opazatika, and Bourinot Townships.

The project better defined the volcanic stratigraphy of the area and revealed the presence of a felsic pyroclastic unit (Berger 1985). Table 5.2 lists the maps and reports, pertaining to the North Clay Belt and Lowland, that were published by the Ontario Geological Survey during 1985.

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

During 1985, two research projects were carried out in the Resident Geologist's area.

A report on Grant 134, entitled "Geochemistry and Petrography of the Mattagami Formation Lignites (Northern Ontario)", was prepared by Winder *et al.* (1985). One conclusion reported in this study is the extremely clean nature (low metal content) of the Moose River Basin coals.

Field work was continued in 1985 in the Williams Island area of the Abitibi River as part of Research Grant 216. This is a study of the Long Rapids Formation shale which is considered a possible source of shale oil. A report on the project, entitled "Sedimentology of the Long Rapids Formation, Preliminary Results", has been prepared by Bezys and Risk (1985).

ACTIVITIES OF OTHER AGENCIES

In addition to the work being done by the University of Western Ontario and McMaster University under the Ontario Research Program (Winder *et al.* 1985; Bezys and Risk 1985), four other projects were reported on in 1985.

A Laurentian University thesis on the sedimentology of the Mattagami Formation (Try 1984) was received by the Resident Geologist office this year.

Work by the Geological Survey of Canada on the Kapuskasing Structure was reported by Percival (1985) and Woods (1985).

An inventory of Industrial Mineral Resources of the North Clay Belt was prepared by Guillet (1985).

MINING AND EXPLORATION ACTIVITY

Lists of the assessment work done and exploration activity, pertaining to the North Clay Belt and Lowland, are found in Tables 5.3 and 5.4.

METALS

Partridge River Area

Noranda Exploration Company Limited filed reports of work in 1985 for work done in 1983/84. Ground electromagnetic and magnetic surveys for a number of localities in the Partridge River Area were completed. This work was in conjunction with a geological mapping program in a large area of volcanic rocks north of Kesagami Lake not presently shown on government geological maps.

McCowan Township Area

A large number of claims have been staked around the patented ground commonly referred to as the Filion Gold Occurrence in McCowan Township. Assessment work reports for ground magnetometer and VLF surveys of the Romex Resources Incorporated/ Omab Enterprises Limited joint venture were received this year.

TABLE 5.3 . EXPLORATION ACTIVITY DURING THE YEAR , 1985 . (Refer to FIGURE 5.3)

NUMBER ON FIGURE	INDIVIDUAL/ COMPANY	ACTIVITY
1	Arsenault, J.	- trenching, blasting, Slack Township
2	Camchib Resources Inc.	- overburden drilling, beneficiation studies, So. of Ridge Lake area
3	Carlson Mines Ltd.	- sampling, diamond drilling, Kipling Township
4	Romex Resources Inc./Omab Enterprises Ltd.	- geophysical surveys - McCowan Township
5	Dome Expl. Ltd.	- diamond drilling - Kesagami River & Detour Lake areas
6	Falconbridge Ltd.	- diamond drilling, rock geochemistry geology, Walls /Hawkins Townships
7	Ingamar Resources Ltd.	- geophysical surveys - Detour L./Sunday Lake areas
8	Lefebvre, L.	- stripping, trenching - Avon Township
9	Ormont Explorations Ltd.	- geophysical survey, Sunday Lake area
10	Westmin Resources Ltd.	- diamond drilling - Detour Lake/Sunday Lake areas
11	Sherritt Gordon Mines Ltd.	- test pit sampling - Cargill Township

Fushumi-Burstall Townships Volcanic Belt

Noranda Exploration Company Limited has completed horizontal loop electromagnetic and magnetic surveys in several locations of this mainly drift-covered volcanic belt stretching from Auden Township northeast to Burstall Township. This company had previously flown airborne geophysical surveys in the area. Assessment work reports, completed by the same company for geophysical surveys in Auden and Burstall Townships, were received in 1985.

Foch-Lessard Townships Area

Reports of work have been filed by Noranda Exploration Company Limited and R.B. Murray for airborne electromagnetic and magnetic surveys in the area. These surveys cover an area west of Hornepayne covering approximately 1200 mining claims.

Caithness-Fergus Townships Volcanic Belt

Prospecting for gold was under way in this area during 1985. A number of mining claims have since been staked across a six-township stretch. A geological study of this area, by the Ontario Geological Survey, is in progress (Berger 1985).

TABLE 5.4 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM--	Airborne electromagnetic survey	Gl--	Geological survey	PEM--	Pulse electromagnetic survey
Ag--	Silver	Gph--	Geophysical survey	Ra--	Radiometric survey
AMag--	Airborne magnetic survey	HLEM--	Horizontal loop electromagnetic survey	Res--	Resistivity survey
ARes--	Airborne resistivity survey			Rtr--	Trenching
Au--	Gold	IP--	Induced polarization survey	Seis--	Seismic survey
AVLF--	Airborne VLF-EM survey	LC--	Linecutting	Str--	Stripping
BM--	Base metals	Mag--	Magnetic survey	U/G--	Underground
Cu--	Copper	Man--	Manual labour	UTEM--	University of Toronto electomagnetic survey
DD--	Diamond drilling	Mech--	Mechanical work		
EM--	Electromagnetic survey	OVD--	Overburden drilling	VLF--	VLF electromagnetic survey
GC--	Geochemical survey	Pb--	Lead		

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Again River, South	32L/4NE	Noranda Expln.	Au	Assess.	Mag,EM	1983	2.6675	T-2641
				Assess.	Mag,EM	1983	2.6676	T-2641
				Assess.	Mag,EM	1983	2.6674	T-2641
Atkinson Lk, Lower Detour Lake	32E/13E	Getty Canadian Metals	Au	Assess.	DD-19-3325.5m	1982-84		T-2443
Auden	42F/16W	Noranda Expln.	Au	Assess.	Mag,HLEM	1984	2.7779	T-2653
Avon	42H/13SE	L. LeFebvre	Au	Assess.	Str,Rtr	1985		T-2340
Bayfield	42C/15NW	Teck Explns.	Au	Assess.	Mag,EM	1984	2.7455	T-2931
				Assess.	Mag,EM	1984	2.7457	T-2931
				Assess.	Mag,EM	1984	2.7458	T-2931
				Assess.	Mag,EM	1984	2.7459	T-2931
				Assess.	Mag,EM	1984	2.7460	T-2931
Burstall	42J/3NE	Noranda Expln.	Au	Assess.	Mag,EM	1984	2.7710	T-2657
Fox R., Pivabiska R., N.Pivabiska R., Renesig Creek, W.Burstall Twp.	42J/3W,4	Noranda Expln.	Au	Assess.	AMag	1984	2.7546	T-2916
Fushimi	42G/13NW	Noranda Expln.	Au	Assess.	EM.Mag	1984	2.7708	T-2644
Glaister Lake	42I/9SE	Noranda Expln.	Au	Assess.	Mag,HLEM	1983	2.8064	T-2831
N.Glaister Lk., Glaister Lk.	42I/9E	Noranda Expln.	Au	Assess.	Mag,HLEM	1983	2.8062	T-2832
Hawkins, Walls	42C/16NE, 42B/13NW	Falconbridge Ltd.	Au	Assess.	DD-4-931.5m	1984		T-2802
				Assess.	DD-23-2500.2m	1984-85		T-2802
		Falconbridge Ltd.		Assess.	Gl,VLF,GC	1984	2.7801	T-2764
Hopper Lake	32E/13NW	Westmin Resources	Au	Assess.	HLEM	1984	2.7827	T-2331
James Bay Lowlands (31 twps.)	42I,42P	Ontario Energy Corp. (Onexco Ltd.)	Lignite	Assess.	OVD,Resistivity	1981	OM81-5C-107 63.4111	T-2886
Kesagami River	42H/16NW	Dome Expln.	Au	Assess.	DD-1-147.2m	1985		T-2813
Larkin	42F/2E	E. Fournier	Au	Assess.	DD-1-69.5m	1984		T-2593
Limestone Rapids	42K/1SE	Mattagami Lake Expln	Au,Ag, Cu,Zn	Assess.	DD-2-217.7m	1984		T-2507
Lower Detour Lake	32E/13NE	Audax Gas & Oil	Au	Assess.	GC Expend.	1984	2.7509	T-2772
		Dome Exploration	Au	Assess.	DD-5-869.6m	1985		T-2447
		Westmin Resources	Au	Assess.	DD-2-61.9m	1985		T-2331
				Assess.	DD-4-833.3m	1985		T-2331
		Westmin Resources	Au	Assess.	VLF	1984	2.8112	T-2859
McCowan	42G/10SW	Romex/Omab J.V.	Au	Assess.	Mag,VLF	1985	2.8007	T-2943
Ridge Lk, South	42J/6SW	Camchib Mines Ltd.	Nb,Phos	Assess.	OVD-17-1311.2m	1984		T-2935
				Assess.	Beneficiation St.	1982-83	2.7884	T-2935
Sanborn, Kipling, Emerson	42J/8SE, 1NE	Lignasco Resources	kimb	Assess.	DD-1-111m	1982-83		T-2413
Slack	42G/1SW	J. Arsenault	Au	Assess.	Manual	1985		T-2363
				Assess.	Manual	1985		T-2363
E.Southbluff Cr., N.Glaister Lk.	42I/9N	Noranda Expln.	Au	Assess.	Mag,HLEM	1983	2.8065	T-2866

TABLE 54 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Sunday Lake	32L/4SE	Canfic Resources	Au	Assess.	Gl,Assays,HLEM	1984	2.7596	T-2775
		Ingamar Expln.	Au	Assess.	Mag,VLF	1983	2.6034	T-2900
		Ormont Expln.	Au	Assess.	VLF	1985	2.7905	T-2663
		Westmin Resources	Au	Assess.	DD-2-474.5m	1984		T-2331
				Assess.	HLEM	1984	2.7474	T-2331
Sunday Lk, Lower Detour Lk.	32L/4SE, 32K/13NE	Westmin Resources	Au	Assess.	DD-1-169.5m	1985		T-2331
Valentine	42I/5SE	B.P. Resources	Diamonds	Assess.	DD-2-270.0m	1982/84		T-2565
Walls	42B/13NW	Falconbridge Ltd.	Au	Assess.	Gl	1984	2.8133	T-2764

Bayfield Township Area

Teck Exploration Limited submitted assessment work reports in 1985 for magnetic and electromagnetic surveys for the mainly drift-covered area south of Hornepayne.

Casselman-Fenton Townships Volcanic Belt

Prospector Joseph Arsenault continued prospecting for gold in the Slack Township property in 1985. Groups of mining claims were recently staked in Staples and Casselman Townships.

Detour Lake Area

The Detour Lake Mine, which is a joint venture between Amoco Canada Petroleum Limited and Campbell Red Lake Mines Limited, completed its second year of production in 1985.

In the past year, steps have been taken to overcome grade and milling problems encountered in 1984. As part of the plan, the ore reserves were revised to 10.9 million tons of 0.128 ounce gold per ton, down from the original 30.2 million tons of 0.113 ounce gold per ton (The Northern Miner, January 31, 1985).

The open pit mining operation will be continued until the third quarter of 1986. Shaft sinking was completed this year to a final depth of 612 m. Lateral development work will commence early in 1986.

Following evaluation, a decision to go ahead with production will be made in the second half of 1986. Underground production would not start up until the first quarter of 1988.

The mill will be kept operating during the last quarter of 1986 using material from a low grade stockpile. Studies are currently under way to keep the mill in continuous operation throughout 1987.

In November, a pilot hole drilled from the 11th level (550 m below surface) confirmed the presence of the main zone at that level.

Production at the present time is 2200 tonnes per day. Millheads to date are slightly under the projected grade for 1985. There are presently 248 persons employed at the mine site (Detour Lake Mine, personal communication, 1985).

The Ontario Geological Survey finished a second field season studying the Detour Lake mine site area (Marmont 1985).

A variety of ground geophysical surveys (I.P., E.M., magnetic) were completed and reported on for the Detour Lake area by Ingamar Resources Limited, Noranda Exploration Company Limited, Ormont Explorations Limited, and Westmin Resources Limited. Petromet Resources Limited submitted a report of work for geochemical studies.

Westmin Resources Limited submitted assessment reports for nine drillholes totaling 1539.2 m that were drilled in the area in 1984 and 1985.

Dome Exploration Limited completed 11 diamond-drill holes in the Lower Detour Lake area as part of its ongoing program to gain geological information in the Detour Lake Mine area. Twenty holes totaling 3100 m were drilled west of the Detour Lake road in the Kesagami River and Marquis Lake map areas. Nothing of economic interest was encountered in this area (Dome Exploration Limited, personal communication, 1985).

Valentine Township

B.P. Resources Canada Limited submitted a drill log for a hole completed in Valentine Township in 1982. The hole which was part of the company's diamond exploration program intersected 47 m of "kimberlitic" breccia.

Oba Volcanic Belt

Falconbridge Limited continued work on its Hawkins-Walls Townships gold properties. Assessment work reports were submitted in 1985 for 27 diamond-drill holes completed in 1984 and 1985, as well as geological mapping and geophysical and geochemical surveys completed in 1984. Parts of these properties have been under option from L. Gervais and D. Bremner.

INDUSTRIAL MINERALS

Sherritt Gordon-Campbell Resources Joint Venture

Cargill Township Phosphate and Vermiculite Deposit The main geological feature of this area is the Cargill carbonatite complex. The phosphate is present as the mineral apatite which forms a residuum deposit above the carbonatite zone. The vermiculite occurs in a leached zone along the contact between carbonatite and pyroxenite.

In 1985, a 100-ton per day mill and assay lab were constructed on the property for the purposes of conducting a pilot mill test for the Cargill phosphate. The mill, which was constructed for warm weather operation, contains a crusher, screen, rod mill, attrition-scruber, separator, cyclonic flotation unit, and disk filter.

A 6000-ton sample from the open pit was put through the mill for mechanical and reagent testing. An end product ranging between 36% to 38% P_2O_5 was achieved. No further work is planned until new phosphate markets develop in Ontario (Sherritt Gordon Mines Limited, personal communication, 1985).

The Kapuskasing Experimental Farm of Agriculture Canada's Research Branch has initiated a project using untreated phosphate rock from the Cargill Township phosphate deposit as a slow release fertilizer. Preliminary tests show that soluble phosphate can be released in compost mixtures. Greenhouse tests are planned for the Kapuskasing facility early in 1986 (Agriculture Canada, personal communication, 1985).

Bench tests on the vermiculite from the Cargill Township property show it to be of high quality. Field tests to date have not been able to substantiate that an economic tonnage of vermiculite exists (Sherritt Gordon Mines Limited, personal communication, 1985).

Martison Lake Phosphate-Niobium Deposit This deposit which lies 100 km north of Hearst is geologically similar to the Cargill carbonatite complex. Guillet (1985) indicated that the Martison deposit contains an estimated 140 million tonnes of 20% P_2O_5 and 0.35% Nb_2O_5. In 1985, assessment work reports were submitted for drill testing and beneficiation studies.

Carlson Mines Limited

In August 1985, Carlson Mines Limited completed three exploration sonic drill holes and an engineering feasibility study on its Kipling Township kaolin-silica sand option. The company is currently stripping overburden and plans to collect a 500 ton bulk sample of kaolin and silica sand. The sample will be shipped to the Ontario Research Foundation for metallurgical testing.

North Clay Belt Industrial Minerals Conference

The North Clay Belt Development Association held a two-day conference in October dealing with the potential of Industrial Minerals in the area. As part of the conference, ceramic, glass, and alabaster crafts made from local materials were on display. Results of firing tests demonstrating the high quality of various clays of the region were also presented.

Three studies were commissioned as part of the conference. The first is an inventory of Industrial Mineral Resources of the North Clay Belt (Guillet 1985). An Industrial Minerals Business Opportunities investigation is being conducted by the firm Currie, Coopers and Lybrand. Peter Bannard Associates have undertaken a study of markets for crafts from Northeastern Ontario.

FIELD AND PROPERTY VISITS

The field and property visits for 1985 are listed in Table 5.5.

HIAWATHA GOLD MINE AREA

During the visit to the former Hiawatha Gold Mine in Lizar Township, an examination was made of the northeast-trending granitic dike. Gold mineralization appears to be spatially associated with this dike which is 400 feet wide, vertically dipping, and cuts pillowed mafic and mafic metavolcanics. Weathered exposures along the shore line of Kabinakagami Lake suggest that it is a quartz-feldspar porphyry. This body may be related to subvolcanic intrusive activity rather than later granitic intrusive activity as shown on present geological maps.

OBA VOLCANIC BELT

In the Oba area, gold mineralization is related to fine-grained felsic tuffaceous zones within mafic metavolcanic flows. A sample of the felsic tuff collected from a trench by the Resident Geologist and analyzed by the Geoscience Laboratories, Ontario Geological Survey, Toronto, was found to contain 480 ppm barium.

SLACK TOWNSHIP

In Slack Township, zones of epidotization, hematitization, and carbonatization were found in some of the mafic metavolcanic exposures. A highly folded chert-magnetite iron formation with pyrite and pyrrhotite replacement zones occurs on the J. Arsenault property. A small piece of pyritic iron formation float located by the Resident Geologist near the end of an old logging road northeast of the Arsenault property, was analyzed by the Geoscience Laboratories, Ontario Geological Survey, Toronto, and found to contain 0.01 ounce gold per ton and 0.52 ounce silver per ton.

PARTRIDGE RIVER VOLCANIC BELT (SOUTH)

A field visit was made to a volcanic belt just south of the Partridge River Volcanic Belt. Geological maps in the Glaister Lake and the West of Glaister Lake areas of the volcanic sequence have recently been submitted (1984) as assessment work reports.

TABLE 5.5 . 1985 FIELD AND PROPERTY VISITS

1. Hiawatha Gold Mine Area
2. Hornepayne Area Granitic Terrain
3. Oba Volcanic Belt
4. Caithness Township Volcanic Terrain
5. Cargill Phosphate Deposit
6. Buchan Township Glacial Formations
7. J. Arsenault Property, Slack Township
8. Kipling Township Kaolin Deposits
9. Cheepash River Gypsum Deposits
10. Moose River Gypsum Deposits
11. Argor Niobium Deposit
12. Partridge River Volcanic Belt South
13. Kenogami River Formation, Low Shoal Island
14. Detour Lake Gold Mine
15. Long Rapids Formation, Abitibi River
16. Mattagami River Siderite Deposits

Thick sequences of pillowed mafic metavolcanics with interbedded felsic tuffs and flows are well exposed in areas of recent forest fires. Primary volcanic features are well preserved. Metamorphic grade is believed to be in the upper greenschist-lower amphibolite range. The area is presently shown on government maps as migmatite.

MOOSE RIVER BASIN

During the course of the field season, boulders of mafic and amygdaloidal volcanic rocks, not unlike the Keweenawan volcanic rocks of the Lake Superior region, were located along the banks of the Moose and Abitibi Rivers in the Moose River Basin. Some of these volcanic boulders are angular and do not appear to have been moved far from their bedrock source.

A drillhole in Kilmer Township, collared in 1943, intersected 41.4 m of "Late Precambrian" amygdaloidal and serpentinized basalt and argillite lying beneath 22.9 m of overburden and overlying granitic basement (Satterly 1953). It is possible that the volcanic boulders, which were found some 70 km downstream from Kilmer Township, represent eroded remnants of a hidden Proterozoic volcanic sequence.

RECOMMENDATIONS FOR PROSPECTING

OBA VOLCANIC BELT

Gold appears to be related to fine-grained felsic tuffaceous rocks interbedded with mafic metavolcanics in Hawkins and Walls Townships. Felsic tuffaceous zones should be given close examination when prospecting for gold in this area. The presence of trace amounts of barium in these rocks may possibly serve as a pathfinder for gold exploration in this belt.

CAITHNESS-FERGUS TOWNSHIPS VOLCANIC BELT

The Precambrian geology of this area has been recently mapped by the Ontario Geological Survey (Berger 1985). In his preliminary report of the area, Berger (1985) makes a number of suggestions for prospecting in the area. Three of these recommendations include, a felsic pyroclastic unit in Pelletier and Doherty Townships which may have potential for base and precious metal mineralization, a shear zone in the vicinity of the Rufus Lake Dam which has produced an area of quartz-muscovite schist that should be prospected for precious metals, and a 250 m thick section of gossan with pyrite and graphite which was mapped in Pelletier Township.

SLACK TOWNSHIP

The gold-bearing float assaying 0.01 ounce gold per ton and 0.54 ounce silver per ton, found in northeast Slack Township, may be from a local source. Prospecting in the area is warranted.

PARTRIDGE RIVER VOLCANIC BELT (SOUTH)

The recently documented volcanic terrain of the Partridge River-Kesagami Lake area may have potential for base and precious metals.

INDUSTRIAL MINERALS

The long term growth projection for many industrial minerals should be considered when formulating exploration plans. The inventory recently compiled by Guillet (1985) covering the industrial mineral potential of the North Clay Belt serves as a good reference for the area.

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6. Timmins Resident Geologist Area, Northern Region

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RESIDENT GEOLOGIST STAFF ACTIVITIES

Staff at the Timmins Resident Geologist's Office includes: M.S. Paradis, Regional Mineral Resources Coordinator, L.E. Luhta, Resident Geologist, P.J. Sangster, Resource Geologist, and D.C. Egerland, Secretary. C.D. Hamblin continued as Drill Core Librarian under a contract administered by the Timmins District Office, Ontario Ministry of Natural Resources. During 1985, D.M. Draper was hired on a contract basis as Data Geologist and J.C. Ireland held the contract position of Economic Geologist for the Swayze Belt. Additional temporary staff hired under Experience '85, Ontario Youth Corps, and Special Employment programs included: P. Blomberg; L. Perron; D. Cholette and K. Marinacci.

The level of exploration activity remained relatively high in spite of the depressed price of gold and base metals during 1985. The staff spent considerable time in consultative duties with over 1800 office consultations recorded. Emphasis was placed on examining and reporting on properties currently being explored and/or developed. Other staff activities included providing geological background information to land use plans; conducting geological field trips; organizing seminars and presenting lectures on local geology. In addition, staff from the Timmins Resident Geologist Office designed and presented two short Prospecting Courses to local groups in 1985.

In the Timmins Resident Geologist's area, there are presently: eight producing gold mines; one producing base-metal mine; and one producing industrial mineral mine. There are seven advance gold evaluation and development projects being carried out and one advanced industrial mineral development project. In 1985, there were 28 major and 78 junior mining exploration companies active in the Timmins area and 35 individuals conducted exploration projects.

CLAIM STAKING ACTIVITY

From December 1984 to the end of November 1985, 5264 claims were recorded in the Porcupine Mining Division. Of this total, 4486 claims were recorded in the Timmins Resident Geologist area. There are at present 21 793 active claims in the Porcupine Mining Division as compared to 26 793 active claims at this time last year. These active claims represent approximately 871 720 acres (352 772 ha) of ground being explored in the entire Mining division. In the Timmins Resident Geologist area, there are 14 947 active claims representing 597 880 acres (241 953 ha) of ground under exploration. Additional programs on patented ground are not included in this acreage.

Intensive staking activity centred on an area within a four-township radius around Timmins and in Rollo, Raney, Marion, Mallard, Benton, and Osway Townships in the Swayze Belt area. Increased staking was noted in Neill Township in the southwestern corner of the Resident Geologist area.

Active stakers in the Timmins Resident Geologist area included: H. Gonzalez; Mid-Canada Exploration; and Ingamar Exploration.

CORE LIBRARY PROGRAM

From January to the end of November 1985, a total of 441 representatives of government and industry made use of the core library facilities. During the same time period, 32 442 m of drill core and samples representing an additional 4900 m of core were collected. The core library now contains approximately 126 035 m of drill core of which 111 300 m has been catalogued and entered onto a computer indexing system. During 1985, drill core was received from the following sources:

Canamax Resources Incorporated
Chevron Resources Canada Limited
Cleyo Resources Incorporated
Comstate Resources Limited
J. Croxall
Diepdaume Mines Limited
Dominion Gulf Company
Esso Minerals Canada
Ingamar Explorations
Kenty Resources Limited
Kerr Addison Mines Limited
Labrador Mining and Exploration Company Limited
Lacana Mining Corporation
Robert S. Middleton Exploration Services Incorporated
Newmont Exploration of Canada Limited
Noranda Exploration Company Limited
Pamour Porcupine Mines Limited
Pominex Limited
Shiningtree Gold Resources Incorporated
Utah Mines Limited
Westmin Resources Limited

OPERATING MINES

BASE METALS

Kidd Creek

Although the complete 1985 figures are unavailable at the time of writing, the projected production for 1985 at the Kidd Creek Mines Limited base-metal mine in Kidd Township is 4 541 000 tonnes. In 1984, the company produced and processed 4 513 000 tonnes of ore from which 211 000 tonnes of zinc concentrates were produced for sale. The company also produced 122 000 tonnes of zinc which was refined at the Kidd Creek metallurgical site in Hoyle Township. Copper concentrates produced for sale totaled 30 000 tonnes. Copper metal produced at Kidd Creek's metallurgical site was 68 000 tonnes. From the remaining concentrate, 37 000 tons of copper metal were produced on a toll basis elsewhere in Canada. Total silver recoverable in 1984 was 271 000 kg. In addition, 600 tonnes of cadmium; 26 000 tonnes of lead silver concentrates, and 414 000 tonnes of sulphuric acid were produced.

Seventy-six percent of production at the Kidd Creek Mine came from the Number One Mine with most of the ore coming from above the 2000-foot (610 m) level.

Most of the deposit is mined out above the 1200-foot (366 m) level. At the Number Two Mine, production took place between the 2600 (792 m) and 4000-foot (1219 m) levels. The bottom level at the Number One Mine is 2400 feet (732 m). The lowest level being developed presently at the Number Two Mine is the 4000-foot (1219 m) level.

Proven and probable reserves to the end of 1984 totaled 67.6 million tonnes containing 3.2% copper, 4.9% zinc, and 67 grams silver per tonne.

It is interesting to note that in 1985, total mined tonnage equalled the proven and probable ore reserve remaining in the mine. This total, mined ore plus ore remaining, represents 131.6 million tonnes down to 4800 feet (1463 m) below surface.

In 1985, underground development at the Number One Mine totaled 9714 m (6402 m of lateral and 3312 m of vertical development). At the Number Two Mine, development totaled 5993 m (including 4610 m of lateral and 1420 m of vertical development). This compares with the 1984 figures of 11 200 m at the Number One Mine and 4575 m at the Number Two Mine. Underground diamond drilling totaled 21 610 m of which 50% was ore delineation drilling. The remaining 50% was considered primary ore definition and exploration drilling. The total underground drilling for 1984 was 22 400 m. Delineation drilling at the Number One Mine is 90% complete. Primary ore definition drilling is beginning on the 4600-foot (1402 m) level. Surface exploration drilling at the Kidd Creek Mine site totaled 1376 m in 1985. This compares to 3000 m of surface drilling done in 1984.

Kidd Creek Mines Limited has started a $66 million expansion of its metallurgical facilities to be completed in 1988. This expansion will enable the company to smelt and refine more of its concentrate production, thus reducing unit costs and increasing net annual revenue.

The number of persons employed in mining and metallurgy at Kidd Creek Mines Limited in Timmins in 1985 was 2713. The 1984 figure was 2808 (Kidd Creek Mines Limited, personal communication, 1985).

PRECIOUS METALS

Dome Mines Limited

In 1985, the Dome Mine in South Porcupine produced gold ore at a rate of 3000 tons (2721 tonnes) per day for first full year.

The Dome's $92 million expansion to increase production from 2000 tons (1814 t) to 3000 tons (2721 t) per day was completed in 1984. Although the 1985 production figures are unavailable at the time of writing, it is expected that the Dome will mine and mill 1 050 000 tons (952 544 t) for the year. In 1984, 860 000 tons (790 179 t) of ore were milled, producing 118 472 ounces (3 684 891 g) of gold. Mill recovery was 97%. The average mill head grade was 0.142 ounce gold per ton (4.85 g/t). Ore sources by mining method are 57% longhole, 33% cut and fill, and 7% from development.

Ore reserves at the end of 1984 were calculated to be 2 629 000 tons (2 384 989 t) grading 0.170 ounce (5.85 g/t) gold per ton. Over 50% of the mill feed is still extracted above the 2000-foot (610 m) level. The lowest working level at the Dome is 4000 feet (1220 m) below surface with the main ore structures being traced below this level.

In 1985, 20 710 feet (6312 m) of lateral development (crosscuts, drifts, and sill drifts) and 1928 feet (588 m) of raising was done. This is lower than the 1984 figures of 21 550 feet (6568 m) and 2720 feet (829 m), respectively. In 1985, underground diamond drilling totaled 53 800 feet (16 398 m) of which exploratory drilling totaling 5850 feet (1783 m) was done in the new Eight Shaft area. This is a little lower than the previous year's total of 54 500 feet (16 612 m) of underground drilling.

At present, two long exploration drives are advancing from the Number Eight Shaft along the 30 and 32 levels (4200 feet (1280 m) and 4500 feet (1372 m) below surface) toward the old Number 7 (internal) Shaft area. This shaft was abandoned in 1971 when exploration was concentrated on finding gold values between 0.20 and 0.25 ounce per ton (6.9 and 8.6 g/t). Now grades of 0.15 to 0.175 ounces (5.1 to 6.0 g/t) are considered to be ore grade.

A total of 776 people were employed by Dome Mines Limited at their operations in South Porcupine during 1985 (Dome Mines Limited, personal communication, 1985).

Owl Creek

At the Kidd Creek Mines Limited Owl Creek open pit gold mine, production to the end of 1985 is anticipated to be 280 000 tonnes. By the end of 1985, 260 000 tonnes of gold ore will have been processed at the Pamour Porcupine Mines Limited gold mill on a custom basis. A total of 20 000 tonnes has been stockpiled for processing at Kidd Creek's copper smelter after the crushing plant has been upgraded. Average mill head grade will be 3.9 grams of gold per tonne.

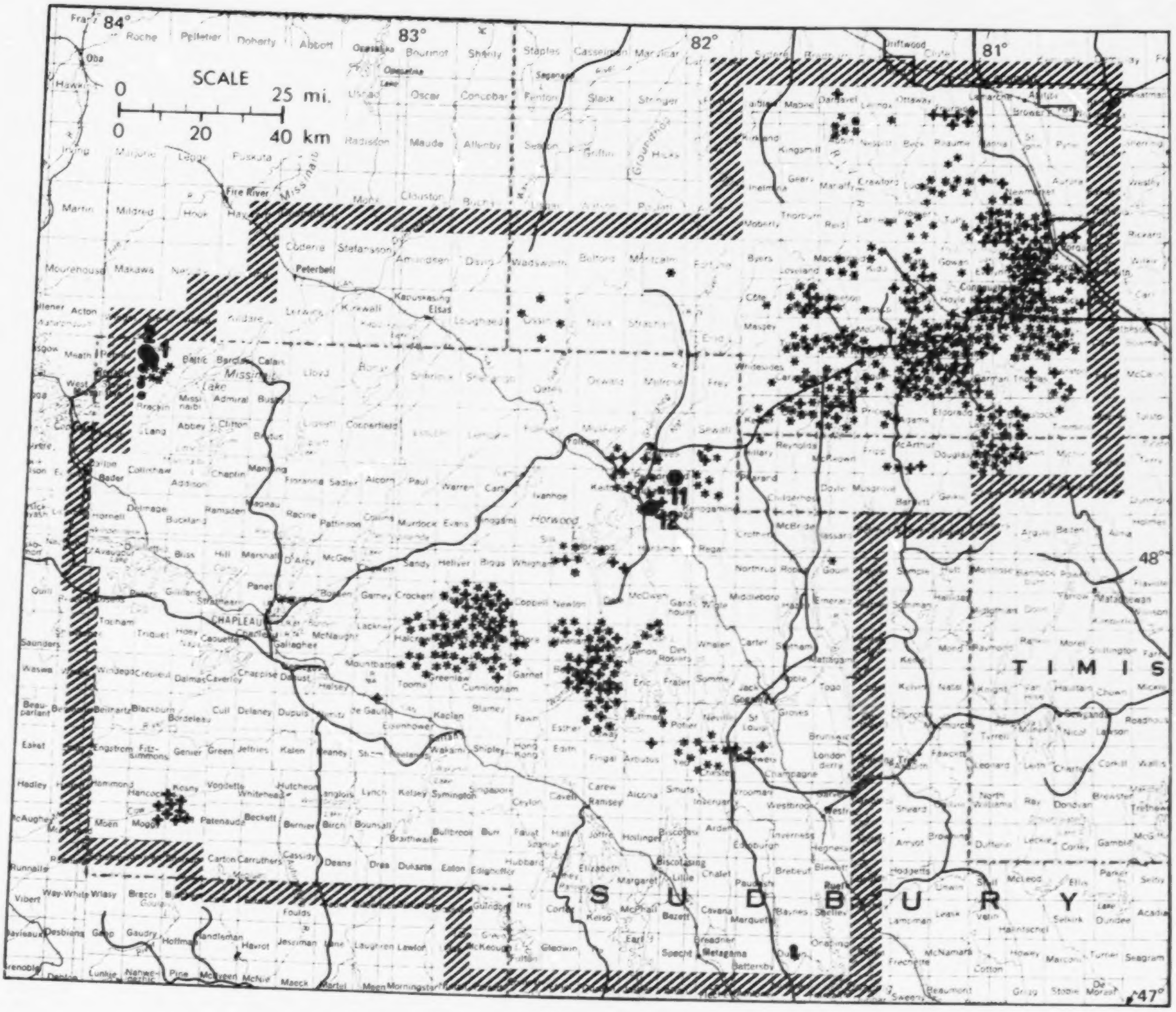
84°
83°
82°
81°
48°
47°
SCALE
0
25 mi.
0
20
40 km
Missinaibi
Fire River
Kapuskasing
Peterbell
CHAPLEAU
Horwood
Groundhog
1
11
12
S U D B U R Y
T I M I S

Figure 6.1
TIMMINS
RESIDENT GEOLOGIST AREA

- ● Producing Mines, 1985
  - 1. Anglo Dominion Gold Exploration and Canreos Minerals (1980) Ltd. . . . . Au
  - 2. Barrick Resources and Royex Gold Mining Corp., Renabie Gold Mine . . . . Au
  - 11. Steetly Talc Ltd., Penhorwood Mine . . talc
  - 12. Extender Minerals . . . . barite
- * Assessment Work Submitted, 1985
- + Claims Staked, 1985
- • Exploration Activity, 1985

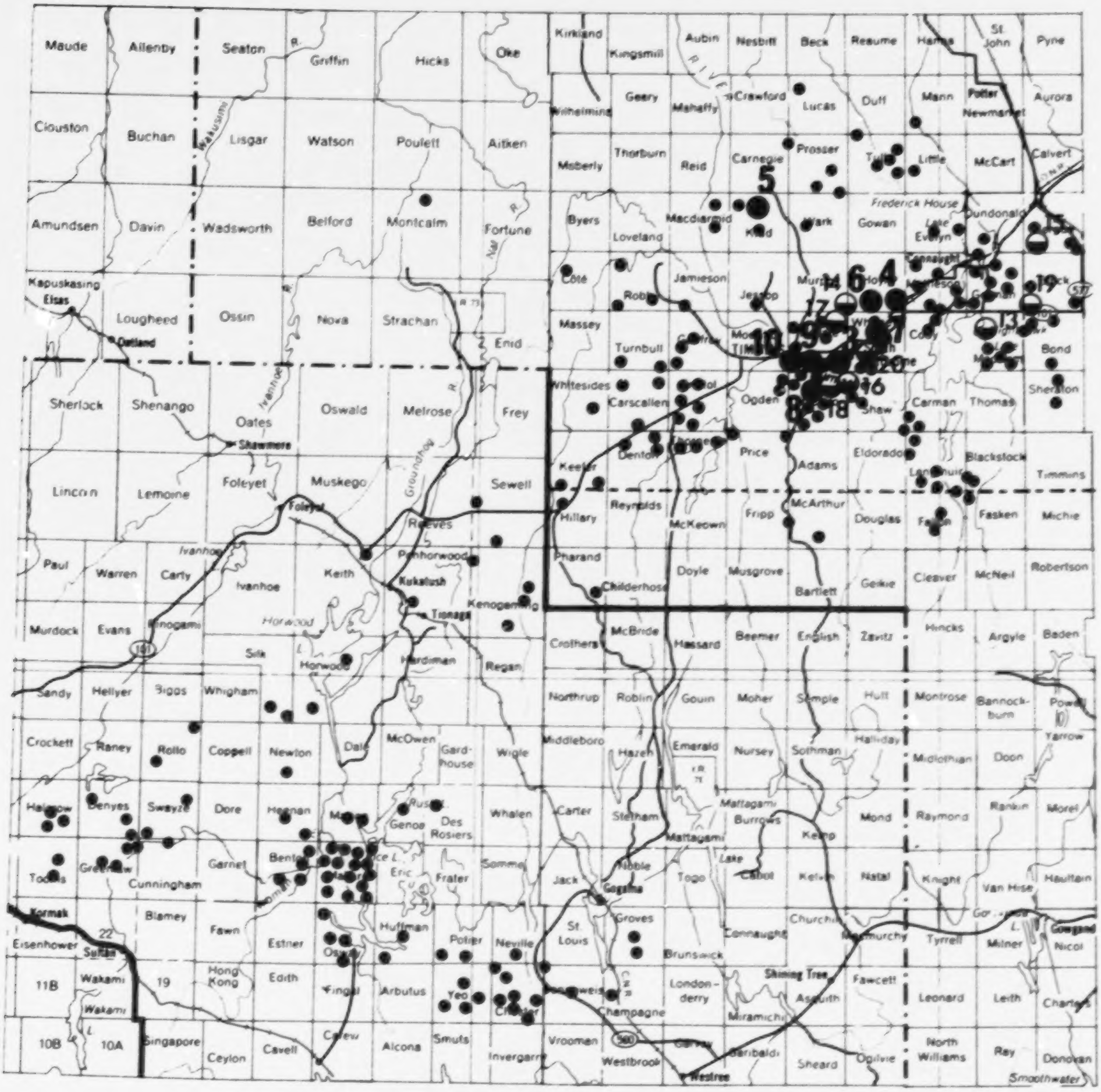
Maude
Allenby
Seaton
Griffin
Hicks
Oke
Kirkland
Kingsmill
Aubin
Nesbitt
Beck
Reaume
Hanna
St. John
Pyne
Clouston
Buchan
Lisgar
Watson
Poulett
Aitken
Wilhelmina
Geary
Mahaffy
Crawford
Lucas
Duff
Mann
Potter
Newmarket
Aurora
Moberly
Thorburn
Reid
Carnegie
Prosser
Little
McCart
Calvert
Amundsen
Davin
Wadsworth
Belford
Montcalm
Fortune
Byers
Loveland
Macdiarmid
Kidd
Wark
Gowan
Frederick House
Evelyn
Dundonald
Kapuskasing
Elsas
Lougheed
Ossin
Nova
Strachan
Enid
Côté
Jamieson
Robb
Jessop
Murphy
Hoyle
Connaught
Mountjoy
Massey
Turnbull
Godfrey
Tisdale
Whitney
Cody
Macklem
Bond
Sherlock
Shenango
Oates
Oswald
Melrose
Frey
Whitesides
Carscallen
Bristol
Ogden
Deloro
Shaw
Carman
Thomas
Sheraton
Shawmere
Denton
Thorneloe
Price
Adams
Eldorado
Blackstock
Lincoln
Lemoine
Foleyet
Muskego
Groundhog
Sewell
Keefer
Langmuir
Timmins
Reynolds
Hillary
Reeves
McKeown
Fripp
McArthur
Douglas
Fallon
Fasken
Michie
Paul
Warren
Carty
Ivanhoe
Keith
Penhorwood
Pharand
Childerhose
Doyle
Musgrove
Bartlett
Geikie
Cleaver
McNeil
Robertson
Murdock
Evans
Horwood
Kukatush
Tionaga
Kenogaming
Crothers
McBride
Hassard
Beemer
English
Zavitz
Hincks
Argyle
Baden
Silk
Horwood
Hardiman
Regan
Sandy
Hellyer
Biggs
Whigham
Northrup
Roblin
Gouin
Moher
Semple
Hutt
Montrose
Bannockburn
Powell
Crockett
Raney
Rollo
Coppell
Newton
Dale
McOwen
Gardhouse
Wigle
Middleboro
Hazen
Emerald
Nursey
Sothman
Halliday
Midlothian
Doon
Yarrow
Halcrow
Denyes
Swayze
Dore
Heenan
Marion
Rush
Genoa
Des Rosiers
Whalen
Carter
Stetham
Mattagami
Burrows
Kemp
Mond
Raymond
Rankin
Morel
Todd
Greenlaw
Cunningham
Garnet
Benton
Chester
Eric
Frater
Sommerville
Jack
Noble
Gogama
Togo
Cabot
Kelvin
Natal
Knight
Van Hise
Haultain
Kormak
Blamey
Fawn
Estner
Osway
Huffman
Potier
Neville
St. Louis
Groves
Connaught
Churchill
Macmurchy
Tyrrell
Milner
Gowganda
Nicol
Eisenhower
Sultan
11B
Wakami
19
Hong Kong
Edith
Fingal
Arbutus
Yeo
Chester
Dalzeil
Brunswick
London-derry
Shining Tree
Asquith
Fawcett
Leonard
Leith
Charters
Champagne
Miramichi
10B
10A
Singapore
Ceylon
Cavell
Crerew
Alcona
Smuts
Invergarry
Vrooman
Westbrook
Garvey
Garibaldi
Sheard
Ogilvie
North Williams
Ray
Donovan
Smoothwater
Westree
Mattagami R.
Ivanhoe R.
Kapuskasing R.
144
560
101
66
22
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Figure 6.2
TIMMINS AREA

● Exploration Activity, 1985

● Producing Mines, 1985

3. Dome Mines Ltd. . . . . Au

Kidd Creek Mines Ltd. (4-6)

4. Hoyle Pond Mine. . . . . Au
5. Kidd Creek Mine . . . . Cu, Zn, Ag, Pb, Cd, Sn
6. Owl Creek Mine . . . . Au

Pamour Porcupine Mines Ltd. (7-10)

7. Pamour No. 1. . . . . Au, Ag
8. Pamour No. 3. . . . . Au, Ag
9. Schumacher Division . . . . Au, Ag
10. Timmins Property . . . . Au, Ag

✱ Assessment Work Submitted, 1985

+ Claims Staked, 1985

◒ Mines and/or Properties Under Development, 1985

13. Asarco Exploration of Canada Ltd., Macklem Twp. . Au
14. Canamax Resources Inc.,Hoyle Twp. . . . . Au
15. Canamax Resources Inc. and Bruneau Mining Corp., Clergue Twp. . . . . Au
16. Diepdaume Mines Ltd., Deloro Twp.. . . . . Au
17. Getty Mines, Davidson Tisdale Property, Tisdale Twp. . . . . Au
18. Puissance Mining Corp., Deloro Twp. . . . . Au
19. St. Andrew's Goldfields, Stock Twp.. . . . . Au
20. Wabigoon Resources, Whitney Twp. . . . . Au

TABLE 6.1 PAMOUR PORCUPINE MINES LIMITED, TIMMINS AREA. PRODUCTION FOR THE YEARS 1984 AND 1985.

	Tons 1985	Tons 1984	Ounces per ton
Number One Mine (underground)	650 000	647 000	0.069
Number One Mine (No. 3 Open Pit)	175 000	n.a.	
Schumacher Division	240 000	275 000	0.082
Timmins Property (1985 underground, 1984 underground and open pit)	160 000	289 000	0.080
Ross Division (underground)	215 000	237 000	0.094
Pamour Number Three (underground)	n.a.	59 000	0.118
Total	1 440 000	1 509 000	0.079

TABLE 6.2 . MAPS AND REPORTS PERTAINING TO TIMMINS RESIDENT GEOLOGISTS AREA PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports

OFR 5440	Peat and Peatland Inventory of the Timmins Kirkland Lake Area

Open File Maps

OFM 25	Underground Geology of the St. Andrew Goldfields Deposit , Stock Township

Preliminary Maps

P.2735	Quaternary Geology of the Matheson Area
P.2848	Preliminary Results of Bedrock Samples from the Sonic Drilling Program , Matheson Area

Miscellaneous Papers

MP 122	Report of Activities 1984 Regional and Resident Geologists
MP 126	Summary of Field Work and Other Activities, 1985
MP 127	Geoscience Research Grant Program Summary of Research 1984-1985

TABLE 6.3

GOLD PRODUCTION TIMMINS RESIDENT GEOLOGIST AREA
(TO THE END OF 1984)

MINE NAME	TOWNSHIP	YEARS OF PRODUCTION	TONS MILLED	OZ. PRODUCED	GRADE
Ankerite	Deloro	1926-1953,-78	4,993,929	957,292	0.19
Ankerite/March	Deloro	1926-1935	317,769	61,039	0.19
Aunor (Pamour No. 3)	Deloro	1940-	8,482,174	2,502,214	0.30
Banner	Whitney	1927-28,-33,-35	315	670	2.13
Bonetal	Whitney	1941-1951	352,254	51,510	0.15
Bonwhit	Whitney	1951-54	200,555	67,940	0.34
Broulan	Whitney	1939-53	1,146,059	243,757	0.21
Cincinnati	Deloro	1922-1924	3,200	736	0.23
Concordia	Deloro	1935	230	16	0.07
Coniaurum/Carium	Tisdale	1913-18, 1928-1961	4,464,006	1,109,574	0.25
Crown	Tisdale	1913-1921	226,180	138,330	0.61
Davidson	Tisdale	1918-1920	9,341	2,438	0.26
De Santis	Ogden	1933,1939-42, 1961-1964	196,928	35,842	0.18
De Santis	Turnbull	1926		13	
Delnite	Deloro	1937-1964	3,847,364	920,404	0.20
Dome	Tisdale	1920-	41,685,914	10,967,075	0.27
Faymar	Deloro	1940-1942	119,181	21,851	0.18
Fuller	Tisdale	1940-1944	44 028	6,566	0.15
Gillies Lake	Tisdale	1929-31,35-37	54,502	15,278	0.28
Goldhawk	Cody	1947	636	53	0.08
Halcrow-Swayze	Halcrow	1935	211	40	0.19
Hallnor (Pamour No. 2)	Whitney	1938-68,-81	4,226,419	1,645,892	0.39
Hollinger-Schumacher	Tisdale	1915-18	112,124	27,182	0.24
Hollinger (Timmins Property)	Tisdale	1910-1968	65,778,234	19,327,691	0.29
		1976-	1,911,200	127,322	0.07
Hoyle	Whitney	1941-44,46-49	725,494	71,843	0.10
Hugh-Pam	Whitney	1926,1948-65	636,751	119,604	0.19
Jerome	Osway	1941-43,1956	335,060	56,893	0.17
Joburke	Keith	1973-75,79-81	302,561	28,440	0.09
Kingbridge/Gomak	Chester	1935-36	1,387	98	0.07
McIntyre (Schumacher)	Tisdale	1912-	36,874,722	10,702,103	0.29
McLaren	Deloro	1933-37	876	201	0.23
Moneta	Tisdale	1938-1943	314,829	149,250	0.47
Naybob	Ogden	1932-1964	304,100	50,731	0.17
Owl Creek	Hoyle	1981-	806,000	89,480	0.12
Pamour	Whitney	1936-	28,518,831	3,047,160	0.11
Paymaster	Tisdale	1915-1966	5,607,402	1,192,206	0.21
Porcupine Lake	Whitney	1937-40,1944	10,821	1,369	0.13
Porcupine Peninsular	Cody	1924-27,-40,-47	99,688	27,354	0.123
Preston	Tisdale	1938-1968	6,284,405	1,539,355	0.24
Preston N Y	Tisdale	1933	2,800	153	0.05
Preston/Porcupine Pet	Deloro	1914-1915		314	
Preston/Porphyry Hill	Deloro	1913-1915	46	312	6.78
Reef Mine	Whitney	1915-65	2,144,507	498,932	0.23
Tionaga/Smith-Thorne	Horwood	1938-39	6,653	2299	0.35
Renabie Mine	Leeson	1947-70,1982-	4,000,000	920,000	0.23
Tisdale Ankerite	Tisdale	1952	14,635	2236	0.15
Tommy Burns/Arcadia	Shaw	1917	21	14	0.28-0.34
Vipond	Tisdale	1911-1941	1,565,218	414,367	0.26
TOTAL NO. OF MINES: 48					
TOTALS:			226,729,580	57,145,439	0.26

TABLE 6.4 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM-- Airborne electromagnetic survey
Ag-- Silver
AMag-- Airborne magnetic survey
ARes-- Airborne resistivity survey
Au-- Gold
AVLF-- Airborne VLF-EM survey
BM-- Base metals
Cu-- Copper
DD-- Diamond drilling
EM-- Electromagnetic survey
GC-- Geochemical survey
Gl-- Geological survey
Gph-- Geophysical survey
HLEM-- Horizontal loop electromagnetic survey
IP-- Induced polarization survey
LC-- Linecutting
Mag-- Magnetic survey
Man-- Manual labour
Mech-- Mechanical work
OVD-- Overburden drilling
Pb-- Lead
PEM-- Pulse electromagnetic survey
Ra-- Radiometric survey
Res-- Resistivity survey
Rtr-- Trenching
Seis-- Seismic survey
Str-- Stripping
U/G-- Underground
UTEM-- University of Toronto electomagnetic survey
VLF-- VLF electromagnetic survey

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Aubin	42A/13NE	Chevron/Hudbay	Au	Assess.	AMag,AEM	1983	2.6605	T-2640
				Assess.	AMag,AEM	1983	2.6606	T-2640
		Chevron Minerals	Au	Assess.	AMag	1983	2.7941	T-2640
				Assess.	AMag	1983	2.7969	T-2640
Benton	41O/9NW	Noranda Expln.	Au	Assess.	Mag,VLF	1985	2.8471	T-2306
Benton, Mallard	41O/9NW	Noranda Expln.	Au	Assess.	Gl	1984	2.7778	T-2305
				Assess.	Mag	1985	2.7971	T-2305
Blackstock, Langmuir, Fallon, Fasken	42A/7SW	Melrose Resources	Au	Assess.	Mag,VLF	1984-85	2.8363	T-2983
Blackstock, Langmuir, Fallon	42A/7SW	Dome Exploration	Au	Assess.	DDH-1-228.6m	1985		T-2997
Bond	42A/7N, 10S	Dome Exploration	Au	Assess.	Mag	1984	2.7436	T-2798
				Assess.	DD-1-113m	1985		T-2798
				Assess.	DD-5-2445m	1985		T-2798
		Labrador Mining	Au	Assess.	OVD-6-236.6m	1985	2.8260	T-2409
Bond, Currie	42A/7NE	Westmin Resources	Au	Assess.	Gl	1984	2.7594	T-2440
Brackin	42B/5SW	Aurelian Developers	Au	Assess.	Mech. Equip.	1984		T-2939
				Assess.	GC	1984	2.8050	T-2939
				Assess.	Mag,VLF	1985	2.7901	T-2939
		Canreos Minerals	Au	Assess.	Gl,GC,Mech.	1984	2.8244	T-2847
		Canreos Minerals	Au	Assess.	Rtr	1984		T-2848
		Jedburgh Resources	Au	Assess.	AMag,AVLF,AEM	1985	2.8335	T-2806
		T. Riordan	Au	Assess.	DD-2-274.3m	1984		T-2919
Bristol	42A/5E,6W	Dome Exploration	Au	Assess.	Mag,EM	1984	2.7851	T-2944
		H.Z. Tittley	Au	Assess.	VLF	1984	2.7501	T-2908
		Utah Mines	Au	Assess.	Mag,EM	1984	2.7565	T-2927
		Westfield Minerals	Au	Assess.	Mag	1984	2.7846	T-2938
Bristol, Carscallen	42A/5NE	Kidd Creek Mines	Au	Assess.	Mag,HLEM,VLF	1984-85	2.7915	T-1941
Bristol, Carscallen, Denton, Thorneloe	42A/5E	Kidd Creek Mines	Au,BM	Assess.	OVD-2-63.1m	1983	2.7737	T-1941
				Assess.	Gl	1983	2.7805	T-1941
				Assess.	DD-1-250m	1985		T-1941
Bristol, Thorneloe	42A/5SE	J. Croxall	Au	Assess.	DD-3-332.3m	1985		T-2913
		Noranda Expln.	Au	Assess.	OVD-9-174.3m	1984	2.7355	T-2645
Carman	42A/6E	Gail Resources	Au	Assess.	Gl,VLF	1985	2.8577	T-2862
Carnegie	42A/11NW, 14SW	Lacana Mining	BM	Assess.	Mag,VLF	1985	2.8067	T-2952
Carscallen	42A/5NE	Cleyo Resources	Au	Assess.	Gl,Mag,VLF	1983	2.6137	T-2628
Carscallen, Denton	42A/5SE	F.J. Colbert	Au	Assess.	DD-1-39.3m	1985		T-3000
				Assess.	Str	1985		T-3000

TABLE 6.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Chester	41P/12SW	Blue Falcon Mines	Au	Assess.	Mag	1984	2.7427	T-2763
		Emerald Isle Res.	Au,BM	Assess.	Gl,VLF	1985	2.8372	T-2994
		Gogama Resources	Au	Assess.	Gl,IP	1984	2.7838	T-2945
				Assess.	DD-3-284.1m	1985		T-2945
		Kidd Resources	Au	Assess.	Mag,VLF	1985	2.8059	T-2946
Chester, Benneweis	41P/12SW	Murgold Resources	Au	Assess.	DD-2-179.5m	1984		T-2433
Chester, Neville	41P/12SW	Nu-Start Resources	Au	Assess.	DD-3-401.7m	1985		T-2998
Chester, Yeo	41P/12SW	Kidd Resources	Au	Assess.	Str	1985		T-2388
Clergue	42A/10N	Kidd Creek Mines	Au	Assess.	Mag,VLF,HLEM	1985	2.8404	T-2989
	42A/10NW	Lac Minerals Ltd.	Au	Assess.	Mag	1985	2.8495	T-3003
				Assess.	Mag	1985	2.8501	T-3003
Cochrane	41O/14W	Noranda Explo.	Au	Assess.	Mag,EM	1982	2.7602	T-2826
				Assess.	DD-1-183.2m	1984		T-2826
Cody	42A/11SE	W.D. Evans	Au	Assess.	Mag,VLF	1982	2.7830	T-2957
		Kidd Creek Mines	Au	Assess.	AMag,AEM	1982	2.7369	T-1990
				Assess.	DD-1-122m	1982		T-1990
		Placer Development	Au	Assess.	Soil Analyses	1982	2.7845	T-2497
Cody, Macklem	42A/10SW	Comstate Resources	Au	Assess.	Mag,Seis,IP	1983	2.6577	T-2930
		Pamour Porcupine Ms.	Au	Assess.	OVD-6-183.2m	1984	2.7437	T-1573
Cote	42A/12S	Mountain Frontier	Au	Assess.	Mag,VLF	1985	2.8252	T-2972
Cunningham	41O/10NE	Kidd Creek Mines	BM	Assess.	DD-3-542.5m	1984		T-2512
			BM	Assess.	Assay Expend.	1983-84	2.8454,2.8455	T-2512
Cunningham, Greenlaw	41O/10NE	Kidd Creek Mines	BM	Assess.	Gl	1982-83	2.8084	T-2512
Dargavel	42A/13NE, 14NW	Chevron Minerals	Au	Assess.	I.P.	1985	2.8599	T-3007
Deloro	42A/6N	Comstate Resources	Au	Assess.	Gl	1983-84	2.7504	T-2909
		Diepdaume Mines	Au	Assess.	Core samples	1984		T-2498
		Legion Resources	Au	Assess.	Vlf	1984	2.7636	T-2647
		C. Morgan	Au	Assess.	Rtr,Manual	1984		T-2907
		Pamour Porcupine Ms.	Au	Assess.	Mag,VLF	1984	2.7439	T-2915
		Pamour Porcupine Ms.	Mgn	Assess.	Gl	1984	2.7919	T-2544
			Au	Assess.	DD-1-76.2m	1985		T-2544
		Puissance Corp.	Au	Assess.	Gl	1984-85	2.8196	T-2839
		L.B.L. Rich Gold	Au	Assess.	Manual	1985		T-2981
		J.P. Sheridan	Au	Assess.	Core samples			T-2498
		J.P. Sheridan	Au	Assess.	Mag,EM,Ra,Assays	1984	2.7847	T-2811
				Assess.	DD-3-103.6m	1985		T-2811
				Assess.	Assays	1985	2.8231	T-2811
Deloro, Shaw	42A/6NE	Diplomat Resources	Au	Assess.	Mag,VLF	1984-85	2.8154	T-2966
Denton	42A/5SE	Gowest Amal. Res.	Au	Assess.	Assays	1985	2.8586	T-2738
		Labrador Mining	Au	Assess.	OVD-18-155.8m, Assays	1984	2.7552	T-2412
		Labrador Mining	Au	Assess.	DD-1-172.5m	1985		T-2964
				Assess.	DD-4-659.6m	1985		T-2964
Denyes	41O/15S	Manville Canada	Au	Assess.	Gl,Ra	1984	2.7751	T-2651
		Placer Development	Au	Assess.	Mech,Rtr	1984		T-2914

TABLE 6A Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Denyes (con't.)		Placer Development	Au	Assess.	Gl,GC,Mag,VLF	1984	2.7436	T-2652
				Assess.	Mag,VLF	1985	2.8136	T-2652
				Assess.	Mag,VLF	1985	2.8137	T-2652
				Assess.	DD-5-608m	1985		T-2652
Denyes, Swayze	410/15S	Canadian Nickel Co.	Au	Assess.	DD-3-241.1m	1984-85		T-2446
Denyes, Greenlaw, Swayze, Cunningham	410/10N, 15S	Folkestone Resources	Au	Assess.	Mag,EM,IP	1984-85	2.7866	T-2656
Desrosiers	410/16SE	Noranda Expln.	BM	Assess.	Mag,HLEM	1985	2.8257	T-2975
Desrosiers, Genoa	410/16SE	Noranda Expln.	Au,Ag,BM	Assess.	Mag,HLEM	1985	2.8256	T-2975
Dore	410/15SE	Canico	Au	Assess.	DD-4-407.5m	1984		T-2446
Dore, Swayze	410/15SE	Swayze Resources	Au,Ag	Assess.	Assays	1983	2.6494	T-2784
Dublin	41P/4E	James R. Young	Au	Assess.	Manual	1985		T-2464
Duff	42A/14SE	B.P. Resources	Au,BM	Assess.	Mag,VLF	1984	2.8002	T-2965
		Kidd Creek Mines	Au	Assess,	Mag,HLEM,AEM,AMag	1985	2.7991	T-2942
		Selco Inc. (BP Res.)	Au,BM	Assess.	Mag,HLEM	1984	2.7533	T-2923
				Assess.	Mag,HLEM	1984	2.7524	T-2923
				Assess.	Mag,EM	1984	2.7525	T-2923
Duff, Reaume	42A/14E	Selco Inc.	Au,BM	Assess.	Mag,HLEM	1984	2.7523	T-2911
Dundonald	42A/10NW	Kidd Creek Mines	Au	Assess.	Gl	1984	2.7672	T-2646
Eldorado, Shaw	42A/16E	Huronian Mines	Au	Assess.	Mag,VLF	1984	2.7762	T-2650
Evelyn	42A/10NW, 11NE	Cominco Ltd.	Au	Assess.	OVD-36-1676.1m	1984	2.7935	T-2885
Evelyn, Dundonald, German	42A/10W, 11NE	Kangeld Resources	Au	Assess.	AMag,AVLF	1985	2.8281	T-2999
Fallon	42A/2NW	D. Meunier	Au	Assess.	Gl	1983-84	2.7404	T-2596
				Assess.	Mag,VLF	1983-84	2.7395	T-2596
				Assess.	Str	1985		T-2596
				Assess.	OVD	1985	2.8289	T-2596
Garnet	410/10NE	Western Pacific	Au,BM	Assess.	AMag,AVLF	1984	2.8181	T-2969
Genoa	410/16SE	Noranda Expln.	Au	Assess.	Mag,HLEM	1985	2.8258	T-2973
German	42A/10SW	Canamax Resources	Au	Assess.	Gl	1984	2.7826	T-2902
		Canamax Resources	Au	Assess.	DD-1-190m	1985		T-2658
		Cominco Ltd.	Au	Assess.	DD-6-1183.5m	1985		T-2757
		Cominco Ltd.	Au	Assess.	OVD-2-91.4m	1985	2.8519	T-2742
				Assess.	OVD-4-127.4m	1985	2.8517	T-2742
				Assess.	OVD-2-110.9m	1985	2.8518	T-2742
		Comstate Resources	Au	Assess.	Gl	1984	2.8186	T-2968
		D. McKinnon	Au	Assess.	OVD-2-96.9m	1985	2.8516	T-2606
		Sheridan Claims	Au	Assess.	Mag	1985	2.7896	T-2662
		R.G. Smith	Au	Assess.	OVD Expend.	1984	2.7163	T-2643
German, Stock	42A/10SW	Cominco Ltd.	Au	Assess.	OVD-1-59.4m	1984	2.7511	T-2742
				Assess.	DD-3-599.8m, OVD-7-283.8m	1985		T-2742
Godfrey	42A/5NE	Esso Resources	BM	Assess.	Gl	1985	2.8523	T-3004

TABLE 6.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Godfrey (con't.)	42A/12SE, 15NE	Kidd Creek Mines	BM	Assess.	Mag,VLF,HLEM	1984	2.8121	T-2613
				Assess.	Mag,VLF,HLEM	1985	2.8221	T-2613
				Assess.	DD-1-180m	1985		T-2613
				Assess.	Str	1985		T-2613
		Labrador Mining	Cu,Zn	Assess.	HLEM	1985	2.8334	T-2996
Gouin	42A/4SE	G.R. Lambier	BM	Assess.	Mech. Equip.	1984		T-2770
Gowan	42A/11NE	Cominco Ltd.	Au	Assess.	OVD-10-314.6m	1984	2.7491	T-2414
Greenlaw	410/10N	Collingwood Energy	Au	Assess.	Gl,Assay	1984	2.8110	T-2955
		Noranda Expln.	Au,Ag	Assess.	DD-1-150m	1985		T-2854
				Assess.	Mag,HLEM	1984	2.8386	T-2854
Greenlaw, Denyes, Halcrow, Tooms	410/10NW, 15SW	Collingwood Energy	Au,Cu	Assess.	DD-14-1704.6m	1984		T-2955
Halcrow	410/15SW	Melrose Resources	Au	Assess.	AEM,AMag,AVLF	1984	2.7567	T-2920
		Topaz Expln.	Au,Ag,Mo	Assess.	Gl,GC,Assays	1984	2.7966	T-2879
Halcrow, Tooms, Greenlaw	410/15SW, 10NW	Quinterra	Au	Assess.	AMag,AEM	1984-85	2.7808	T-2649
		Regal Petroleum	Au,Ag	Assess.	Gl,Assays	1984	2.8113	T-2878
Heenan	410/16SW	Falconbridge Ltd.	Au	Assess.	DD-8-984.2m	1984		T-2345
Heenan, Marion	410/16SW	Falconbridge Ltd.	Au	Assess.	HLEM	1982	2.7756	T-2345
				Assess.	DD-1-227.7m	1985		T-2345
				Assess.	Assays	1984	2.8485	T-2345
Heenan, Marion, Genoa	410/16S	Falconbridge Ltd.	Au	Assess.	DD-8-1248.8m	1985		T-2345
Hillary	42A/5SW	Elmond Gauthier	Au	Assess.	Manual,Str	1985		T-3001
Horwood	410/16NW	J. Landers	Au	Assess.	Manual	1984		T-2424
		J. Landers	Au	Nonassess	Gl	1984	2.8032	T-2424
			Au	Assess.	Str	1985		T-2424
Huffman	410/9E	Blue Falcon Mines	Au	Assess.	Mag,VLF	1985	2.8189	T-2752
Jamieson	42A/12SE	Kidd Creek Mines	Au	Assess.	Str	1984		T-2660
Jamieson, Godfrey	42A/12SE	Kidd Creek Mines	Au	Assess.	DD-1-140m	1985		T-2543
Jessop	42A/11SW	Kidd Creek Mines	BM	Assess.	DD-2-657m	1985		T-2477
Keefer	42A/5S	C. Bruneau	Au	Assess.	Mag (dip needle)	1984		T-2917
		F. Galata	Au	Assess.	Mech.	1985		T-1556
Keefer, Thorneloe	42A/5SW	Noranda Expln.	Au	Assess.	Gl	1984	2.7485	T-2924
Keith	42B/1W	G. Sanford	Au	Assess.	Str	1984		T-2822
Keith, Muskego	42B/1NW	Utah Mines Ltd.	Au	Assess.	I.P.	1985	2.8384	T-2991
Kenogaming	42A/4W	Carl Creek Res.	Au	Assess.	Gl,Rtr,Sampling	1985	2.8437	T-2793
		Golden Range Res.	Au	Assess.	Str expend.	1984		T-2751
		Ingamar Explns.	Au	Assess.	Rtr,Str	1985		T-2845
		Reba Resources Ltd.	Au	Assess.	I.P.,VLF, Resistivity	1984	2.7718	T-2830
Kidd	42A/11NW	Kidd Creek Mines	BM	Assess.	DD-4-411m	1983-84		T-2936
				Assess.	OVD-6-156.5m	1985	2.8537	T-2755
		J.P. Sheridan	BM	Assess.	Mag,EM	1985	2.8158	T-2962
Langmuir, Fallon	42A/7SW	D.Meunier	Au,BM	Assess.	Mag,VLF	1984	2.8028	T-2951
	42A/6SE	D.Meunier	Au	Assess.	OVD	1985	2.8490	T-2951
Langmuir, Carman	42A/6SE	MK Gold Prospect	Au	Assess.	VLF	1985	2.8127	T-2974
Lennox	42H/3SW	Chevron Minerals	Au	Assess.	AMag	1983	2.7970	T-2954

TABLE 6A Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Little	42A/11NE	L. Jolin	BM	Assess.	Mag	1984	2.7442	T-2909
	42A/10NW	Selco Inc.	BM	Assess.	Mag,HLEM	1984	2.7529	T-2912
	42A/14SE	Selco Inc.	BM	Assess.	Mag,HLEM	1984	2.7528	T-2925
		Selco Inc.	BM	Assess.	Mag,EM	1984	2.5727	T-2929
Little, Mann	42A/14SE	Selco Inc.	BM	Assess.	Mag,EM	1984	2.7526	T-2928
Lucas	42A/14S	Kidd Creek Mines	Au,BM	Assess.	OVD-8-347.9m	1984	2.8027	T-2949
				Assess.	OVD-4-71.0m	1984	2.8026	T-2949
				Assess.	OVD-43-1479.4m	1985	2.8467	T-2949
Macdiarmid	42A/11NW, 12NE	Kidd Creek Mines	Au	Assess.	HLEM,Mag	1984	2.7564	T-2899
				Assess.	DD-1-263m	1984		T-2899
		566307 Ontario Ltd.	Au	Assess.	Gl	1984	2.7977	T-2905
				Assess.	Mag,VLF	1985	2.8164	T-2905
				Assess.	DD-10-1458.2m	1985		T-2905
Macklem	42A/7NW	Livingstone Energy	Au	Assess.	Mag,VLF	1985	2.8284	T-2895
		United Kingdom Energy	Au	Assess.	DD-3-1030.8m	1985		T-2736
Macklem, Bond	42A/10S,7N	Goldeidt Explns.	Au	Assess.	DD-4-621.2m	1985		T-2533
Mallard	410/9N	Neville Expln.	Au	Assess.	AMag,AVLF	1985	2.8218	T-2978
		Noranda Expln.	Au	Assess.	DD-2-304.8m	1985		T-2305
				Assess.	Mag,VLF	1985	2.8411	T-2305
		Tonopah Resources	Au	Assess.	AMag,AVLF	1985	2.8217	T-2979
Matheson	42A/11SE, 10SW	G. Boissoneault	Au	Assess.	Mag,Vlf	1985	2.7975	T-2941
		Cominco Ltd.	Au	Assess.	OVD-5-144.2m	1984		T-2403
				Assess.	OVD-7-119.5m	1983-84	2.8346	T-2403
				Assess.	OVD-8-146.3m	1985	2.8538	T-2403
		Kidd Creek Mines	Au	Assess	AEM,AMag	1982-84	2.7563	T-2825
				Assess.	DD-1-74m	1985		T-2825
		Kidd Creek Mines	Au	Assess.	DD-1-231m	1985		T-1984
		Kidd Creek Mines	Au	Assess.	DD-1-122.0m	1985		T-2986
		Pamour Porcupine Ms.	Au	Assess.	OVD-8-193.2m	1985	2.8375	T-2984
McArthur, Fripp	42A/13N	Cleyo Resources	Au	Assess.	DD-2-214.6m	1985		T-2940
McCart	42A/10NW, 15SW	Selco Inc.	Au	Assess.	Mag,HLEM	1984	2.7531	T-2910
		Selco Inc.	Au	Assess.	HLEM	1984	2.7532	T-2922
Montcalm	42B/9NE	Kerr Addison Ms.	Au	Assess.	DD-2-420.3m	1985		T-2953
Mountjoy	42A/6NW, 11SW	Grand Saguenay	Au	Assess.	I.P.,HLEM	1984	2.7128	T-2882
Murphy	42A/11S	Carlo Rizzo	Au	Assess.	DD-3-96.9m	1984		T-2921
				Assess.	Str	1984		T-2921
		Comstate Resources	Au	Assess.	Mag	1983-84	2.7675	T-2482
				Assess.	Str	1984		T-2482
Neill	410/5SE	Verse Lake Mining	Au	Nonassess	Rept,Assays	1985		T-2807
Newmarket, McCart	42A/15SW	Selco Inc.	BM	Assess.	Mag,EM	1984	2.7530	T-2922
Ogden	42A/6NW	Canamax-Noranda J.V.	Au	Assess.	DD-2-476m	1984		T-2801
				Assess.	DD-1-248m	1984		T-2801
		Canamax-Noranda J.V.	Au	Assess.	DD-1-111.3m	1984		T-2842
		Noranda Expln.	Au	Assess.	OVD-9-245.8m	1984	2.8161	T-2801
		Noranda Expln.	Au	Assess.	DD-1-261.5m	1984		T-2977

TABLE 6.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ossin	42B/10SE	Noranda Expln.	BM	Assess.	Mag,H.EM	1983	2.7547	T-2926
				Assess.	Gl	1984	2.7506	T-2926
				Assess.	DD-2-312.4m	1984		T-2926
Oswsy	410/9	Blue Falcon Mines	Au	Assess.	Mag	1984	2.7514	T-2752
				Assess.	Mag,Gl	1984	2.7794	T-2752
		Blue Falcon/Benton	Au	Assess.	Gl	1984	2.7635	T-2781
		Noranda Expln.	Au	Assess.	Mag,VLF	1985	2.8443	T-2995
Penhorwood	42B/1E	Karvinen & Assoc.	Au	Assess.	Gl	1985	2.8602	T-3005
		Manville Canada	Au	Assess.	Mag,Gl	1984	2.8146	T-2959
		Quinterra Res.	Au	Assess.	Gl	1984	2.7497	T-2814
				Assess.	Manual	1984		T-2814
Potier	41P/12SW	Hargor Resources	Au,Ag, Cu,Zn	Assess.	DD-2-243.8m	1985		T-2873
Price	42A/6SW	Albert J. Amory	Au	Assess.	DD-3-214.3m,Core	1984-85		T-2980
		M. Deschene	Au	Assess.	Mag	1985	2.7910	T-2937
Prosser	42A/14SE	Kidd Creek Mines	BM	Assess.	Str,Rtr	1984		T-1741
				Assess.	Str,Rtr	1985		T-1741
Prosser, Wark	42A/11NE	Golden Range Res.	Au,Cu, Zn,Pb	Assess.	OVD,Assays	1985	2.8213	T-2758
Raney	410/15SW	J-Dex Mining & Expl.	Au	Assess.	Gl	1984	2.7320	T-2180
				Assess.	Assays	1984	2.7407	T-2180
Reaume	42A/14NE	Selco Inc.	BM	Assess.	Mag,HLEM	1984	2.7522	T-2934
Reeves	42B/1NE	Comstate Resources	Au	Assess.	GC	1984-85	2.8449	T-2867
Reeves, Sewell, Kenogaming, Penhorwood	42A/14W	R.J. Sheppard	Au	Assess.	AEM	1983-84	2.8066	T-2799
Robb	42A/12SE	Asarco Expln.	Au	Assess.	OVD-10-192.3m	1985	2.8085	T-2958
				Assess.	Mag,VLF	1985	2.8486	T-2958
		Jonpol Explns.	Au	Assess.	DD-1-122.5m	1984		T-2948
		Legion Resources	Au	Assess.	Mag,HLEM	1985	2.8296	T-2982
		Stellar Resources	Au	Assess.	Mag,EM	1985	2.7790	T-2655
				Assess.	Mag,VLF	1985	2.8045	T-2655
Rollo	410/15E	Hanson Lake Res.	Au	Assess.	GC,Assays	1983-84	2.8044	T-2963
		Kenty Resources	Au	Assess.	Assays	1984-85	2.7904	T-2731
Sewell	42A/15SW, 14NW	Comstate Resources	Au	Assess.	Gl	1985	2.8366	T-2898
		R.U. Tremblay	Au	Assess.	Man.,Mech.	1984-85		T-2971
Shaw	42A/6NE	Ralph Allerston	Au	Assess.	Str,Rtr	1984-85		T-1200
		Brown McDade Res.	Au	Assess.	Mag,VLF	1985	2.8385	T-2988
		Can. Nickel Co. Ltd.	Au	Assess.	DD-3-261.5m	1984		T-166
Sheraton	42A/7NW	Lac Minerals	Au	Assess.	Mag	1985	2.8496, 2.8497,2.8498, 2.8499,2.8500	T-3002
Sheraton, Timmins, Egan	42A/7E	Manville Canada	Au	Assess.	Gl,Rs	1984	2.7535	T-1856
Silk	410/16NW	Orofino Resources	Au	Assess.	Gl,Mag,VLF	1985	2.8333	T-2992
Silk, Norwood	410/16NW	Orofino/Northgate	Au	Assess.	Assays	1984	2.7218	T-2126

TABLE 6.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Stock	42A/10S	R.E. Allerston	Au	Assess.	Mech.	1984		T-2659
		Canamax Resources	Au	Assess.	Gl	1984	2.7767	T-2840
				Assess.	DD-1-186m	1984		T-2840
		Cominco Ltd.	Au	Assess.	OVD-1-32.6m	1984		T-2742
				Assess.	DD-5-242.0m	1984		T-2742
				Assess.	Mag,VLF	1985	2.8232	T-2742
Stock, German	42A/10SW	Canamax Resources	Au	Assess.	Gl	1984	2.7781	T-2840
Swayze	410/15SE	Canadian Nickel Co.	Au	Assess.	DD-3-206.1m	1985		T-2446
				Assess.	DD-1-75.3m	1985		T-2446
				Assess.	Assays	1985	2.8151	T-2446
		Swayze Resources	Au	Assess.	Str	1985		T-2784
				Assess.	Assays	1985	2.8433	T-2784
				Assess.	Str,Sampling	1984		T-2784
				Assess.	Assays	1984	2.7837	T-2784
Swayze, Cunningham	410/15SE, 10NE	Quinterra Resources	Au	Assess.	AEM,AMag	1985	2.7807	T-2649
Swayze, Denyes	410/15S	Canadian Nickel Co.	Au	Assess.	Mag	1984	2.8152	T-2446
Swayze, Denyes, Dore	410/15S	Canico Ltd.	Au	Assess.	Gl	1984	2.7716	T-2446
				Assess.	Assays	1983-84	2.7995	T-2446
Thorneloe	42A/5SE	Comstate Resources	Au	Assess.	GC Analyses	1985	2.8060	T-2961
		Comstate Resources	Au	Assess.	GC,Analyses	1984	2.7878	T-2428
		Esso Minerals	Au,Ag	Assess.	OVD-7-161.2m	1984	2.7419	T-2890
		Esso Resources	Au	Assess.	DD-5-1006.5m	1985		T-2890
				Assess.	Assays	1985	2.8144	T-2890
Thorneloe, Bristol	42A/5E	James Croxall	Au	Assess.	Mech,Str,Manual	1984		T-2913
Tisdale	42A/11S,6N	Comstate/Placer J.V.	Au	Assess.	DD-2-213.1m	1984		T-2682
		Hollinger Argus	Au	Assess.	DD-2-333.3m	1985		T-2520
		Newmont Expln.	Au	Assess.	Gl	1984	2.7619	T-2933
		Newmont Expln.	Au	Assess.	HLEM	1984	2.7621	T-2444
				Assess.	Gl,GC	1984	2.7661	T-2444
		Pamour Porcupine Ms.	Au	Assess.	Gl	1984	2.7440	T-2439
				Assess.	OVD-10-204.4m	1984	2.7438	T-2439
				Assess.	DD-1-277.4m	1985		T-2439
		508825 Ontario Ltd.	Au	Assess.	Manual	1984		T-2556
				Assess.	Assays	1984	2.7981	T-2556
Tooms	410/10NW	Quinterra Resources	Au,Ag, Cu,Ni	Assess.	Assays	1983	2.8006	T-2493
				Assess.	DD-7-726.6m	1983		T-2493
		Taina Gold Inc.	Au	Assess.	Gl	1984	2.7950	T-2950
Tooms, Greenlaw	410/10NW	Quinterra Resources	Au	Assess.	Manual	1984		T-2649
		Quinterra Resources	Au	Assess.	DD-4-703.5m	1983		T-2493
Tully	42A/14SE	Kidd Creek Mines	Au	Assess.	Mag,HLEM	1985	2.8405	T-2987
Tully, Little	42A/14SE, 11NE	Cominco Ltd.	Au	Assess.	Mag,VLF	1985	2.8119	T-2750
Turnbull	42A/12SE, 5NE	Loki Resources	Au	Assess.	Mag	1984	2.7791	T-2648
		C.R. Morgan	Au	Assess.	Manual,Mech.	1984		T-2947
		655 Group Holdings	Au	Assess.	AMag,AVLF	1985	2.8160	T-2612

TABLE 64 **Continued**

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Turnbull, Carscallen	42A/5NE	Chevron Minerals	Au,Cu,Zn	Assess.	Gl,GC	1984	2.7942	T-2904
				Assess.	DD-2-497m	1985		T-2904
Wark	42A/11NW	Kidd Creek Mines	BM	Assess.	Mag,HLEM	1985	2.8510	T-3006
Wark, Murphy	42A/11	Comstate Resources	Au	Assess.	Mag,Manual	1984	2.7351	T-2482
				Assess.	Gl	1984	2.7714	T-2482
				Assess.	GC	1984	2.7715	T-2482
Wark, Prosser	42A/11NE	Golden Range Res.	Au,BM	Assess.	Mag,VLF	1985	2.8190	T-2758
Whitesides	42A/5NE	Robert G. Smith	Au	Nonassess	OVD	1985	2.8198	T-2993
Whitney	42A/11SE,	R.E. Allerston	Au	Assess.	Manual	1983-84		T-1052
	6NE	Daryl Bremner Prop.	Au	Assess.	Mag,VLF	1985	2.8173	T-2967
		Comstate/Placer J.V.	Au	Assess.	DD-2-1512m	1984		T-2491
		Kidd Creek Mines	Au	Assess.	DD-1-226.5m	1984		T-2960
		K. Lehtimaki	Au	Assess.	Gl	1985	2.8408	T-2990
		Paul Meunier	Au	Assess.	Mag	1985	2.8105	T-2956
		Multivest Fin. Ser.	Au	Assess.	GC	1984	2.7515	T-2642
		J.P. Sheridan	Au,Cu	Assess.	Mag	1985	2.8231	T-2976
		Shiningtree Gold Res.	Au	Assess.	Mech.,Manual	1984		T-2532
		H.H. Sutherland	Au	Assess.	Gl	1985	2.8389	T-2985
Whitney, Tisdale	42A/11SE	P. Meunier	Au	Assess.	Gl	1985	2.8313	T-2956
	42A/11S	Newmont	Au	Nonassess	Gl,GC, DD-19-4.824.4m	1983/84		T-2918
Teo	410/9SE,	Kidd Creek Mines	Au	Assess.	Mag,HLEM,VLF	1984	2.7420	T-2771
	41P/12SW			Assess.	DD-3-885.7m	1984		T-2771
		Kidd Resources	Au	Assess.	Mag,VLF	1985	2.8174	T-2388

INFORMATION RECEIVED UNDER THE ONTARIO MINERAL EXPLORATION PROGRAM

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Bond	42A/7,10	Westmin Resources	Au	OMEP	DD-2-305.5m OVD-10-320.3m	1983	63.4238 82-5C-167	T-2440
Delore	42A/6NW	Diepdaume Mines Ltd.	Au	OMEP	Report	1982	63.4209 82-5C-146	T-2498
Hoyle	42A/11SE	Regis Development/ Rio Alto Explns.	Au	OMEP	DD-3-478.8m	1983	63.4217 82-5C-165	T-2932
Mahaffy	42A/13SE	Hudson Bay Expl. and Dev.	Au	OMEP	DD-1-115.5m	1981	63.3946 51-PE47-C81	T-2906
Ossway, Huffman, Mallard	410/9N	Granges Expln. AB	Au,BM	OMEP	Gl,HLEM,DD-8-483m	1982	63.4237 82-5C-110	T-2661
Robb, Jamieson	42A/12SE	Glory Mining & Refining	Au	OMEP	OVD,Assays,Rtr DD-7-653.2m	1982	63.4212 82-5C-155	T-2608
Tisdale	42A/6NW	Vedron/Pamour J.V.	Au	OMEP	DD-16-1245.1m	1983	63.4231 83-5C-88	T-2479
Whitney	42A/11SE	Omenica Resources	Au	OMEP	Summary Rept.	1983	63.4192 82-5C-97	T-2869

TABLE 6.5 EXPLORATION ACTIVITY DURING THE YEAR.

Number on Figure	Individual or Company	Location	Activity
1.	Adeline International Mines	Mallard Township	Diamond Drilling
2.	R. Allerston	Bristol Township	Assays , Geophysical and Geochemical Surveys
		Shaw Township	Stripping
3.	A.J. Amory	Price Township	Diamond Drilling
4.	Asarco Exploration Company	Robb Township	Geophysical Surveys and Overburden Drilling
5.	Aurelian Developers Ltd.	Brackin Township	Geophysical Surveys and Diamond Drilling
6.	B.P. Resources Canada Ltd. (Selco Division)	Duff , Little , Mann and McCart Townships	Geophysical Surveys
7.	Benton Resources , Blue Falcon Mines Ltd., Consolidated Silver Butte	Benneweis , Benton , Chester , Groves, Huffman , Mallard, Marion , Osway and Yeo Townships	Airborne Geophysical Surveys
8.	Blue Falcon Mines Ltd.	Huffman Township	Geophysical Surveys
9.	Blue Falcon Mines Ltd., G. Leliever	Osway Township	Geological Surveys
10.	C. Boissoneault	Matheson Township	Geophysical Surveys
11.	E. Boudreau	Whitney Township	Stripping
12.	D. Bremner	Whitney Township	Geophysical Surveys
13.	Brown-McDade Mines Ltd.	Shaw Township	Geophysical Surveys
14.	Canadian Gold Resources	Mallard , St..Louis and Neville Townships	Airborne Geophysical
15.	Canadian Nickel Company (Canico)	Denyes Township	Diamond Drilling
		Swayze Township	Diamond Drilling and Assays
16.	Canamax Resources	German Township	Diamond Drilling
17.	Carl Creek Resources	Kenogaming Township	Geological Survey , Trenching and Sampling
18.	Carlson Mines Ltd.	Rollo Township	Stripping
19.	Chester Minerals Ltd.	Chester Township	Diamond Drilling
20.	Chevron Minerals	Dargavel Township	Geophysical Survey
		Fournier Township	Airbourne Geophysics
		Muskego Township	Geochemical and Lithogeochemical Surveys
		Robb Township	Geophysical Surveys
		Turnbull Township	Diamond Drilling
		Whitney , Shaw , Tisdale and Mountjoy Townships	Stream Geochemical Surveys
21.	Cleyo Resources	Carscallen Township	Geological and Geophysical Surveys
		Matheson Township	Overburden Drilling
		McArthur Township	Diamond Drilling
22.	P.J. Colbert	Carscallen Township	Diamond Drilling and Stripping
23.	Cominco Ltd.	Evelyn Township	Geophysical Surveys and Overburden Drilling
		German , Matheson and Stock Townships	Diamond Drilling , Overburden Drilling and Geophysical Surveys
		Tully and Little Townships	Geophysical Surveys
24.	Comstate Resources	Cody Township	Diamond Drilling
		Deloro Township	Geological Survey
		Reeves Township	Assays
		Sewell Township	Geological Survey and Assays
		Thorneloe Township	Geochemical Survey
25.	Conquest Yellowknife	Brackin Township	Airborne Geophysical Survey
26.	J. Croxall	Bristol Township	Diamond Drilling
27.	Diepdaume Mines Ltd.	Cody Township	Diamond Drilling
28.	M. Deschene	Price Township	Geophysical Survey

TABLE 6.5 Continued

Number on Figure	Individual or Company	Location	Activity
29.	Diplomat Resources	Deloro and Shaw Townships	Geophysical and Geological Surveys and Stripping
30.	Dome Exploration	Blackstock and Langmuir Townships	Diamond Drilling , Geophysical Surveys and Trenching
		Bond Township	Diamond Drilling
		Bristol Township	Diamond Drilling
		Newton Township	Diamond Drilling
31.	Emerald Isle Resources	Chester Township	Geological and Geophysical Surveys
32.	Esso Minerals Canada	Bond Township	Overburden Drilling
		Bristol and Carscallen Townships	Geological and Geophysical Surveys
		Godfrey Township	Geological and Geophysical Surveys and Diamond Drilling
		Thorneloe Township	Diamond Drilling and Assays
33.	Exsics Exploration Ltd	McArthur Township	Geophysical Survey
34.	Falconbridge Ltd.	Deloro Township	Geological Surveys , Stripping and Sampling
		Heenan and Marion Townships	Diamond Drilling
		Thorneloe Township	Geological Surveys , Stripping and Sampling
		Whitney Township	Diamond Drilling
35.	Folkstone Resources	Cunningham , Denyes and Greenlaw Townships	Geophysical Surveys
36.	Gail Resources	Carman Township	Geological and Geophysical Surveys
37.	F. Galata	Keefer Township	Mechanical Equipment
38.	E. Gauthier	Hillary Township	Stripping and Manual Work
39.	Gogama Resources	Chester Township	Diamond Drilling
40.	Goldeidt Exploration	Macklem Township	Diamond Drilling
41.	Golden Range Resources	Kenogaming Township	Geophysical Survey and Assays
		Prosser Township	Overburden Drilling and Assays
		Wark and Prosser Townships	Geophysical Surveys
42.	Gowest Amalgamated Resources	Denton Township	Overburden Drilling
43.	Granges Exploration AB	Greenlaw Township	Geochemical Survey
44.	Greyhawk	Greenlaw Township	Linecutting
45.	Hanson Lake Resources	Rollo Township	Geochemical Survey and Assays
46.	Hargor Resources	Potier Township	Diamond Drilling
47.	Hilton Resources Corp.	Macklem Township	Geophysical Survey
48.	Hollinger Argus	Tisdale Township	Diamond Drilling
49.	Ingamar Exploration	Kenogaming Township	Trenching , Stripping , Assays and Geological Surveys
50.	Interquest Resources	Heenan Township	Geochemical Survey
51.	Jedburgh Resources	Brackin Township	Airborne Geophysical Surveys
52.	Kangeld Resources	Evelyn , German and Dundonald Townships	Airborne Geophysical Surveys
53.	W. O. Karvinen and Associates	Penhorwood Township	Geological Survey
54.	M. C. Kean	Langmuir and Carman Townships	Geophysical Survey
55.	Kerr Addison Mines Ltd.	Montcalm Twp.	Geophysical Surveys and Diamond Drilling
		Tully Twp.	Geophysical Surveys and Diamond Drilling
56.	Kidd Creek Mines Ltd.	Bristol and Carscallen Townships	Geophysical Surveys and Diamond Drilling
		Clergue Township	Geophysical Surveys
		Duff Township	Geophysical Surveys and Airborne Geophysical Surveys
		Godfrey Township	Geophysical Surveys , Stripping and Diamond Drilling

TABLE 6.5 Continued

Number on Figure	Individual or Company	Location	Activity
56.	Kidd Creek Mines Ltd.	Jamieson and Jessop Townships	Diamond Drilling
		Kidd and Lucas Townships	Overburden Drilling
		Matheson Township	Diamond Drilling
		Prosser Township	Trenching and Stripping
		Tisdale , Tully and Wark Townships	Geophysical Surveys
57.	Kidd Resources	Chester and Yeo Townships	Airborne and Ground Geophysical Surveys
		Groves and Potier Townships	Airborne Geophysical Surveys
		Yeo Township	Stripping
58.	Kingbird Resources / Blue Falcon Mines Ltd.	Yeo Township	Airborne Geophysical Surveys
59.	E.J. Korba	Horwood Township	Geophysical and Geological Surveys
60.	Labrador Mining	Bond Township	Overburden Drilling
		Denton Township	Diamond Drilling
		Godfrey Township	Geophysical Survey
61.	Lac Minerals	Clergue,Sheraton	Geophysical Surveys
		Fallon and Langmuir	Geological and Geophysical Surveys and Sampling
62.	Lacana Mining	Carnegie Township	Geophysical Surveys
63.	J. Landers	Horwood Township	Stripping
64.	Legion Resources	Robb Township	Geophysical Surveys
65.	K. Lehtimaki	Whitney Township	Geological Survey
66.	Livingstone Energy	Macklem Township	Geophysical Surveys
67.	Loki Resources	Deloro Township	Stripping
68.	Magenta Development	Pharand Township	Geochemical and Geological Surveys
69.	D. Mannx and D. Cale	Champagne Township	Airborne Geophysical Surveys
70.	Maverick Mountain Resources	Osway and Mallard Townships	Airborne Geophysical Surveys
71.	D. McKinnon	Bond Township	Airborne Geophysical Surveys
		Clergue Township	Geophysical Surveys
		German Township	Overburden Drilling
		Matheson Township	Overburden Drilling
72.	Melrose Resources	Blackstock , Fallon, Langmuir and Fasken	Geophysical Surveys
73.	D. Meunier	Fallon Township	Overburden Drilling and Stripping
		Langmuir Township	Geophysical Surveys and Overburden Drilling
74.	P. Meunier	Whitney and Tisdale Townships	Geophysical and Geological Surveys
75.	M.K. Gold Prospect	Langmuir and Carman Townships	Geophysical Survey
76.	Milner Consolidated Silver Mines Ltd.	Tisdale Township	Diamond Drilling
77.	J.A. Mortson	Deloro Township	Geophysical Surveys
78.	Mountain Frontier	Cote Township	Geophysical Surveys
79.	Neville Exploration	Mallard Township	Airborne Geophysical
80.	Noranda Exploration	Benton , Mallard , Desrosiers , Genoa , Osway , Greenlaw and Mallard Townships	Geophysical and Geochemical Surveys and Diamond Drilling
		Bristol Township	Diamond Drilling
		Keefer Township	Geochemical Surveys
		Mann Township	Airbourne Geophysical Surveys
		Ogden and Deloro Townships	Diamond Drilling
81.	Noranda Exploration and Berle Resources Joint Venture	Mallard Township	Diamond Drilling

TABLE 6.5 Continued

Number on Figure	Individual or Company	Location	Activity
82.	Noranda Exploration and Pamour Porcupine Mines Joint Venture	Macklem Township	Diamond Drilling
83.	Nu-Start Resources	Chester Township	Diamond Drilling
		Chester and Neville Townships	Airborne Geophysical Surveys
84.	Orofino Resources	Silk Township	Geophysical and Geological Surveys
85.	Pamour Porcupine Mines Ltd.	Deloro Township	Diamond Drilling
		Matheson Township	Overburden Drilling
		Tisdale Township	Diamond Drilling and Overburden Drilling
86.	Pamour Porcupine Mines and Loki Resources Joint Venture	Deloro Township	Stripping , Trenching and Overburden Drilling
87.	P. Perrault	German Township	Geophysical Surveys
88.	Placer Development	Denyes Township	Geophysical Surveys and Diamond Drilling
89.	Puissance Mining Corp.	Deloro Township	Geological Survey and Bulk Sampling
90.	Quebec Sturgeon River Mines	Stock Township	Diamond Drilling
91.	Quinterra Resources	Halcrow , Tooms , Greenlaw , Swayze and Cunningham Townships	Airborne Geophysical Surveys
92.	Regal Petroleum	Halcrow Township	Stripping
93.	L. B. L. Rich	Deloro Township	Manual Labour
94.	R. Salo and L. J. Salo	Bond and Sheraton Townships	Airborne Geophysical Surveys
95.	Sangold	Keith Township	Stripping
96.	R.J. Sheppard	Swayze , Greenlaw , Denyes and Cunningham Townships	Geophysical and Geological Surveys
97.	J.P. Sheridan	Deloro Township	Diamond Drilling and Assays
		Kidd and Whitney Townships	Geophysical Surveys
98.	Sheridan Claims	German Township	Geophysical Survey
99.	G.R. Smith	Mallard Township	Airborne Geophysical
100.	R.G. Smith	Whitesides Township	Overburden Drilling
101.	Stellar Resources	Robb Township	Geophysical Surveys
102.	Storimin Exploration	Sewell Township	Diamond Drilling
103.	Sulpetro Minerals	Newton Township	Diamond Drilling
104.	N. H. Sutherland	Whitney Township	Geological Survey
105.	Swayze Resources	Swayze Township	Stripping and Assays
106.	Tonopah Resources	Mallard Township	Airborne Geophysical Surveys
107.	R.U. Tremblay	Sewell Township	Manual Labour and Mechanical Equipment
108.	Ultrex Petroleum	Horwood Township	Diamond Drilling
109.	United Kingdom Energy Corp.	Macklem Township	Diamond Drilling and Overburden Drilling
110.	Utah Mines	Bristol Township	Geological , Geochemical and Geophysical Surveys and Assays
		Keith and Muskego Townships	Geological , Geochemical and Geophysical Surveys
111.	Verse Lake Mining	Neill Township	Stripping , Trenching and Assays
112.	Weaco	Benton , Mallard Townships	Geological Surveys and Airborne Geophysical Surveys
113.	Westfield Minerals	Bristol Township	Geological , Geophysical and Geochemical Surveys
114.	Westmin Resources	Bond Township	Diamond Drilling
115.	James R. Young	Dublin Township	Manual Labour
116.	508825 Ontario Ltd.	Tisdale Township	Assays
117.	566307 Ontario Ltd.	Macdiarmid Township	Geophysical Surveys and Diamond Drilling
118.	655 Group Holdings	Turnbull Township	Airborne Geophysical Surveys

At present, the fifth bench is the lowest mining bench with production coming from the third and fourth benches as well. The last full bench will be the ninth with limited production coming from the tenth, 100 m below surface.

Reserves at the Owl Creek Mine to the end of 1985 are 725 000 tonnes at 4.1 grams gold per tonne.

Hoyle Pond

At the end of April 1985, Kidd Creek Mines Limited made a decision to bring the Hoyle Pond gold mine into production. Underground evaluation of the deposit, located just east of Kidd Creek's Owl Creek mine in Hoyle Township, began in the summer of 1983. A decline was driven from surface, eastward. Presently, the decline is down to the third level, 166 m below surface. The fourth level, 211 m below surface, will be reached in 1986. To obtain mill feed, three sublevels were driven above the second level, on ore, at 6.5 m intervals. A ramp is presently being driven to the fourth. Total lateral development at Hoyle Pond in 1985 was 2197 m.

Milling of Hoyle Pond gold ore began November 9, 1984, at a rate of 300 tonnes per day, five days a week using the Asarco Exploration mill in Macklem Township. The mill was previously used by Asarco Exploration Company of Canada Limited to test mill material from the Aquarius gold deposit. Mining was postponed indefinitely at the Aquarius mine and the mill was made available to Kidd Creek Mines Limited on a custom basis.

Total production for 1985 at Hoyle Pond was 64 000 tonnes at a grade of 14.43 grams of gold per tonne (70 550 tons at 0.42 ounce gold per ton). Mill recovery was 96%. All production was from development as no stopes have yet been put into production. Cut and fill mining is planned for Hoyle Pond with copper slag to be used as fill. A mining method above the second level where the subdrifting has taken place "to obtain quick muck" has yet to be decided on. Sublevel retreat followed rapidly by filling is one of the options being considered.

To bring the Hoyle Pond mine into production, $14.4 million has been budgeted. This includes the construction of a gold mill at Kidd Creek metallurgical site and upgrading the crushing plant. New mine offices and a dry are being built.

Air, water, and power lines have been completed. The mill is designed for 300 tonnes per day, seven days a week but will be capable of handling 600 tonnes per day. Planned tonnage is 425 tonnes per day, five days per week. In 1986, 96 000 tonnes are to be mined and milled.

In August 1985, Kidd Creek Mines Limited made an agreement to acquire the rights to the Schumacher Estate property which lies to the west and along strike of the Hoyle Pond mine.

Present ore reserves at Hoyle Pond are 405 000 tonnes grading 15 grams gold per tonne. A total of 61 people are presently working at both Owl Creek and Hoyle Pond (Kidd Creek Mines Limited, personal communication, 1985).

Pamour Porcupine Mines Limited

At the time of writing, December 10, 1985, the complete 1985 production figures for Pamour Porcupine Mines Limited are unavailable. However, an estimated breakdown of 1985 production compared to 1984 production is shown in Table 6.3.

The average gold grade for the total 1985 production is expected to be the same as that in 1984.

Pamour Porcupine Mines Limited custom milled 260 000 tonnes of gold ore from the Kidd Creek Mines Limited Owl Creek open pit mine.

In 1985, Pamour Porcupine Mines Limited completed: 12 000 feet (3658 m) of stope preparation and development and 20 000 feet (6096 m) of diamond drilling at the Number One Mine; 2000 feet (610 m) of stope preparation and development and 8000 feet (2438 m) of diamond drilling at the Schumacher Division; 2700 feet (823 m) of stope preparation and development and 4000 feet (1219 m) of diamond drilling at the Ross Division. In 1985, Pamour rerouted a 1.5 km section of Highway 101 to the south of the Pamour townsite at the Number One Mine. The total cost of this move was $1 000 000. This work will enable the company to mine the new Number Three open pit located just to the south of the old Number One pit. An additional $1 500 000 was spent on pit preparation and on the purchase of new equipment for the project.

In October 1984, Pamour announced the closure of Pamour Number Three (underground); Timmins Property (underground); and the Schumacher Division (underground) due to poor economic conditions. The Schumacher Division was subsequently given a reprieve and continues to operate on a month to month basis. Pamour Porcupine Mines Limited is investigating the possibility of extracting ore from the walls of the previously mined shrinkage stopes on the Number Three vein system. Although these stopes produced high grade ore, narrow mining widths dictated by unstable ground conditions resulted in ore being left in the walls.

Sand fill will be removed from these stopes. Sloughing, possibly induced by blasting will then take place. Drawpoints will be driven at the bottom of the stopes where the ore would be mucked out. If successful, this scheme could extend the life of the mine considerably.

In August 1985, it was announced that Noranda Incorporated intended to sell its 48.7% share of Pamour Porcupine Mines Limited to Jimberlana Minerals N.L. of Australia for $10.00 per share or $34 130 170. The agreement is to take effect on December 27, 1985 (Pamour Porcupine Mines Limited, personal communication, December 10, 1985).

Renabie Mine

The Renabie Mine in Leeson Township continued gold production through 1985. Renabie Gold Mines Limited is owned by Barrick Resources Corporation (50%) and Royex Gold Mining Corporation. Royex is controlled by International Corona Resources Limited.

Most of the year's production from the Renabie Mine came from below the 3105-foot (946 m) level (the bottom level in the mine) by a sublevel caving stoping method. Access to this ore was by a decline. Five sublevels at 30-foot (9.1 m) intervals below the 3105 level have been developed. Two small shrinkage stopes in the upper levels provided a minor amount of ore in early 1985.

Presently, the company is sinking a winze to access ore below 3105 since there is an economic depth limit to ramping. The winze is down to the 3600-foot (1097 m) level and is scheduled to be completed by the third quarter of 1986 reaching the 4300-foot (1310 m) level.

The mine is presently producing between 15 000 to 18 000 tons (13 608 to 16 330 tonnes) per month. Although the 1985 figures are unavailable at the time of writing, the mine is expected to produce 152 000 tons (137 892 tonnes) at a grade of 0.205 ounces (7.0 g) gold per year.

In 1985, drifting eastward on the 1400-foot (427 m) level was carried out towards the projected extension of the Nudulama gold zone. This zone is projected to plunge onto the Renabie property just below the 900-foot (274 m) level. A total of 1000 feet (305 m) of lateral development was done and 1000 feet of underground diamond drilling was completed. An additional 14 000 feet (4267 m) is planned from the 1400-foot level.

Surface exploration on the property by Renabie Gold Mines Limited consisted of geophysical and geochemical surveys and 25 diamond-drill holes totaling 7800 feet (2377 m) being drilled.

In 1985, 170 people were employed at the Renabie Gold Mine. (Renabie Gold Mines Limited, personal communication; personal observations, 1985).

Anglo Dominion Gold Exploration Limited

Anglo Dominion Gold Exploration Limited and Canreos Minerals (1980) Limited have signed an agreement with Kidd Creek Mines Limited to supply Kidd Creek's smelter in Timmins with gold-bearing flux. The agreement took effect on October 1, 1985, and calls for a total shipment of 160 000 tons (145 000 tonnes) over two years. Anglo Dominion Gold Exploration Limited and Canreos Minerals (1980) Limited will be paid for 87% of the contained gold. The silica content must be at least 77% silica. By the end of 1985, 18 000 tons (16 329 tonnes) will have been shipped with all of the ore coming from the Anglo Dominion property. Missibay Mining Limited, a private company, is the contractor for the project.

At the Anglo Dominion property in Leeson Township (former Nudulama Property) a 2400 ton (2177 tonnes) bulk sample grading 0.17 ounce gold per ton (5.8 g/t) was mined by open pit on the Number One Vein and shipped to the Kidd Creek smelter in January 1985. Open pit mining is presently being done on the west end of this vein.

At the east end of the vein, a decline, started in August 1985, has been driven down to the 150-foot (32 m) elevation. The first sublevel was driven along the vein for 500 feet (152 m), 75 feet (23 m) below surface. The vein zone here is from 7 to 30 feet (2.1 to 9.1 m) wide and slashing to the extremities of the ore was done on this sublevel. On the second sublevel, 300 feet (91 m) of drifting on vein was completed, 200 feet (61 m) below surface. It is planned to mine the Number One vein by vertical sublevel retreat to 500 feet (152.4 m) below surface. The top of the vein will be mined by open pit. All ore trucked to Kidd Creek in 1985 has come from this open pit and from the underground development.

On the Canreos property (the former Braminco property in Brackin Township), slashing of waste was done at the end of 1985 on the 21 vein open pit in preparation for mining a second 20-foot (6.1 m) bench. It was from this pit that a 2943 ton (2670 tonne) bulk sample grading 0.27 ounce gold per ton (9.2 g/t) and 77.9% silica was taken to the Noranda Horne Smelter in Quebec in February 1984. In November 1984, a 250 ton (227 tonne) sample also was taken from this pit and shipped to the Kidd Creek smelter. This sample was reported to assay 0.32 ounce gold per ton (11 g/t).

At the end of 1985, a decline was started at the south end of the 21 vein to access both the 21 vein and the Number 7 vein. 15 000 feet (4572 m) of diamond drilling was also done on the property to explore between the known veins in 1985.

Thirty people are employed by Missibay Mining Limited on both the Canreos and Anglo Dominion properties (Missibay Mining Limited, personal communication; personal observations; various Northern Miner articles, 1985).

INDUSTRIAL MINERALS

Steetley Talc Limited

In 1985, Steetley Talc Limited completed a $3.76 million expansion started in 1982. The expansion was funded partly by a grant for $940 000 from the government of Ontario through the Board of Industrial Leadership and Development (BILD). A series of small projects brought the total talc-producing capabilities at the company's facilities to 36 000 tons (32 658 tonnes) per year. An additional expansion, started in 1985 to bring the capacity to 60 000 tons (54 431 tonnes) per year, is scheduled to be completed by July 1986. Total cost for this is estimated to be $4.2 million. Steetley Talc Limited's market share is continuing to grow, even though competition is great.

Operations in 1985 included open pit mining and stockpiling of 120 000 tons (108 862 tonnes) of ore during the early part of the year. In 1985, 35 000 tons (31 751 tonnes) of beneficiated talc was produced compared to 30 000 tons (27 215 tonnes) in 1984 and 23 100 tons (20 956 tonnes) in 1983. The ore is mined and the talc concentrated at the mine site in Penhorwood Township. The concentrate is then trucked to the fine-grind plant in Timmins. The product is sold to the pulp and paper, paint, cosmetic, plastics, and rubber industries.

Steetley Talc Limited presently employs 50 people at its Timmins operations. This is the same number as in 1983 (Steetley Talc Limited, personal communication, 1984).

Extender Minerals Limited

In November 1984, Extender Minerals Limited began developing a barite deposit in the southwestern corner of Penhorwood Township. A new, 5 km access road north of the C.N.R. main line was constructed to access the property. To date, 1000 feet (305 m) of decline reaching a vertical depth of 150 feet (46 m) has been completed. The ramp will advance to reach the 180-foot (55 m) elevation by 1986. On the main vein structure, 50 feet (15 m) of drifting has been completed at the 100-foot (30 m) elevation. When the decline reaches a point underground just south of the open cut, a crosscut will be driven to the vein and a raise driven up along it into the open cut. Underground diamond drilling will be used to delineate the main vein at depth. Total expenditures to date are estimated to be just over $600 000.

The main barite vein strikes 050° and dips vertically. It is up to 7 feet (2.1 m) wide and occupies the sheared contact within a syenite. A narrow sheared serpentinized rock occurs along the south side of the vein. Quartz, barite, and fluorite stringers are adjacent to the vein. A second barite vein from 3 inches to 2 feet (7.6 cm to 0.61 m) in width located to the south of the main vein has been intersected by the ramp. This vein also occurs in sheared syenite.

During 1985, 130 tons (118 tonnes) of barite ore grading 50% was shipped to the Extender Minerals Limited mill in Matachewan. This ore was taken from a surface stockpile of underground development muck.

The appeal of this barite is its pure white colour which is in great demand.

Current plans are to produce 10 000 tons (9071 tonnes) of barite per year beginning in 1987. Total expenditures to date are estimated to be just over $600 000 for the project. Current barite reserves are estimated at 60 000 tons (54 431 tonnes).

Five people are presently employed at the project (Extender Minerals Limited, personal communication; personal observations, 1985).

PROPERTY EVALUATION AND DEVELOPMENT

CANAMAX RESOURCES INCORPORATED

Canamax Resources Incorporated as operator of a 50/50 joint venture with CSA Minerals Incorporated began a shaft sinking project at the Bell Creek gold deposit in Hoyle Township in late 1984. The objective of the underground program is to confirm gold grades estimated from drillhole data and examine mining conditions of the 'A' horizon of the North Zone.

In 1985, shaft sinking was completed to a depth of 280 m. However, a fire on July 30 destroyed the hoist building and electrical panel delaying the lateral development by three months. Stations will be cut at the 30, 60, 120, 180, and 240 m elevations. Crosscutting to the north zone, 285 m north of the shaft will be done on the 60 and 120 m levels. Results of this work will be evaluated and a decision will be made whether or not to go on with Phase II. This next program will include testing the zone on two additional levels and drifting and raising in the gold zone to confirm and develop reserves. The total budget for this underground development is $13 million.

Almost 5000 m of diamond drilling was done in 1985 on the property. This drilling was done to delineate the Marlhill gold zone located 800 m northeast of the North Zone. An additional 1200 m of drilling was done to explore an adjacent property optioned from the Schumacher Estate. Drill-indicated reserves on the Canamax Resources Bell Creek property are: 505 000 tonnes grading 6.7 grams gold per tonne for the North Zone ('A' horizon); 200 000 tonnes grading 7.1 grams gold per tonne for the Marlhill Zone and 272 000 tonnes grading 4.1 grams gold per tonne for the Bell Creek Zone. All zones are reported to contain potential for increasing reserves. While the North Zone ('A' horizon) is the target for the underground development, the Bell Creek Zone is situated closer to the shaft and will be readily accessible from underground for further exploration and development. As well, many drill intersections between the North Zone and the Bell Creek Zone can be evaluated from underground. The 'B' horizon of the North Zone will also be readily accessible for underground evaluation (Canamax Resources Incorporated, personal communication; various Northern Miner articles, 1985).

In late 1984, Canamax Resources Incorporated and joint venture partner Bruneau Mining Corporation discovered a new gold zone in the northeastern corner of German Township on property optioned from Clavos Porcupine Mines Limited. This 1984 discovery was made 305 m west of the original Clavos gold zone in Stock Township. By the end of December 1985, a total of 90 holes (over 22 000 m) will have been drilled on the property with 62 of these holes drilled in 1985. For the last six weeks of 1985, four drills were operating on the property. The total strike length of gold mineralization thus far outlined on this zone is 1500 m with the zone still open in both directions. Drilling thus far has concentrated on determining the horizontal limits of the mineralization. When this is done, fill-in drilling to establish continuity of the mineralization and to establish drill-indicated reserves will be done. The vertically dipping gold zone is located just south of the Pipestone Fault. All drilling is done from south to north and rocks intersected by the holes in this direction are; sediments, tuffs, mafic volcanic rocks, feldspar porphyry, sheared ultramafic rocks (talc chlorite schist fault zone), and massive ultramafic rocks. The gold occurs in quartz stockworks on the north and south contacts of the porphyry, which is between 2 and 30 m wide, auriferous, but not of economic grade (Canamax Resources Incorporated, personal communication; various Northern Miner articles, 1985).

DAVIDSON TISDALE MINES LIMITED/GETTY MINES LIMITED

Getty Mines Limited and Davidson Tisdale Mines Limited made an agreement in early 1984 to evaluate the latter company's gold deposit in Tisdale Township. Getty Mines Limited can earn a 50% interest in the property by spending $6 million. After over 40 000 feet (12 192 m) of diamond drilling in 1984, an indicated reserve of 823 850 tons (747 384 tonnes) grading 0.36 ounce gold per ton (12.3 g/t) with a potential for an additional 1.2 million tons (1.08 million tonnes) was published. Another deposit of 170 795 tons grading 0.33 ounce gold per ton (154 942 tonnes grading 11.3 g/t) was outlined.

Work done on the property in 1985 included the drilling of ten surface diamond-drill holes in January and February and four holes in May. A decision was made in the spring of 1985 to proceed with an underground program on the property to mine a 3000 ton (2721 tonne) bulk sample, accurately determine its grade, and to compare the results to an uncut drill-indicated grade. The resulting information would be used to calculate a more accurate cut grade in the previously outlined reserve blocks.

Dewatering of the underground workings began in June 1985. A headframe and hoist were erected over the old Horsehoe inclined shaft. A 70 m drift was driven from the shaft to connect to the old workings on the 500-foot (152 m) level near the centre of the mineralized zone.

Five horizontal diamond-drill holes and two inclined holes were drilled into the zone from the old drift. A 3000 tonne block of drift height was divided into areas of approximately 77 tonnes each. Each area was mined, stockpiled, crushed, and separately put through a sampling tower on surface.

Each sample was split three times in the sampling tower, resulting in the original 77 tonne sample being represented by a 5 gallon pail of sample for assay and a 45 gallon drum of sample for metallurgical testing. The backs of the underground excavation were chip sampled. Seventeen raises were driven up 55 m at +45° along the footwall of the ore to define and test vertical continuity. The total cost of this underground program was estimated to be $2 million.

Davidson Tisdale Mines Limited purchased 18 claims adjoining their property from Broulan Resources Incorporated. Drilling began in late 1985 to explore these claims. Davidson Tisdale Mines Limited is solely funding this drilling program without participation by Getty Mines Limited. It was reported that four holes intersected a previously known shallow north dipping quartz zone at a depth of 120 m. Visible gold was observed in these intersections (Getty Mines Limited, personal communication: personal observations; various Northern Miner articles, 1985).

ASARCO EXPLORATION COMPANY OF CANADA LIMITED

After test mining and milling 32 000 tons (29 029 tonnes) of material grading 0.225 ounce gold per ton (7.7 g/t) in 1984, Asarco Exploration Company of Canada Limited placed their underground Aquarius project on hold in 1985 except for 78 feet (24 m) of crosscutting on the 150 m level to a felsic body mineralized with gold. This body, 150 m south of the shaft, was previously discovered in 1984 by surface diamond drilling. Seven holes totaling 465 feet (142 m) of underground diamond-drill holes were drilled into this gold zone.

Asarco Exploration Company of Canada Limited was studying the feasibility of mining the whole gold-bearing carbonate horizon by open pitting instead of mining out the higher grade sections by underground methods. This approach requires much more definition drilling. One of the major obstacles to this plan is the presence of an esker system near the deposit which could act as an aquifer resulting in a water problem in the pit. Lack of financing and the present low price of gold is postponing any further developments on the property (Asarco Exploration Company of Canada Limited, personal communication, 1985).

WABIGOON RESOURCES LIMITED

In late 1985, Wabigoon Resources Limited began evaluating the old Hunter Mine property in Whitney Township. The company was recently reorganized, with financing amounting to $400 000 for 1985 and $350 000 for 1986 to carry out the project. By the end of 1985, six surface-drill holes totaling 3500 feet (1067 m) were drilled on the property. Underground workings, located partly on the property, were partially dewatered and the first two levels (232 feet (71 m) and 300 feet (91 m) below surface) were made accessible. Underground mapping and sampling were being carried out in December and 2000 feet (610 m) of underground diamond drilling was done. Testhole sampling of the walls was done with a jackleg percussion drill on the two levels. Geophysics and mapping were done on surface. Surface drilling off the ice on Porcupine Lake will be done during the winter of 1986 (Wabigoon Resources Limited, personal communication, 1985).

DIEPDAUME MINES LIMITED

Diepdaume Mines Limited is keeping the underground workings of the old Preston East Dome Mine pumped out to the 600-foot (183 m) level. In mid-November 1985, a program of grab sampling old chutes and muck left in some of the drifts from previous mining was done. A sampling program was conducted on the old tailings. Work in the mill was stopped for the winter. The mill is scheduled for completion in August 1986 (Diepdaume Mines Limited, personal communication, 1985).

PUISSANCE MINING CORPORATION

Puissance Mining Corporation took eight bulk samples totaling 178 tons (161 tonnes) from its property in Deloro Township for custom milling by Pamour Porcupine Mines Limited. Seven of these samples were taken from the carbonate zone along an evenly divided spacing for over 2000 feet (610 m). Two samples from adjacent sample locations assayed 0.15 ounce gold per ton (5.1 g/t) and 0.06 ounce gold per ton (2.1 g/t). The remainder assayed <0.03 ounce gold per ton (1.0 g/t). A bulk sample from the iron formation on the property in contact with the carbonate zone assayed 0.065 ounce gold per ton (2.2 g/t). The average grade of the eight samples was 0.055 ounce gold per ton (1.9 g/t). Plans for 1986 are to extensively sample between the two adjacent sections which had the highest grade. An exploration program to locate other carbonate zones on the property was recommended by the consultant (Dave Constable, Consultant, Sudbury, personal communication, 1985).

ST. ANDREW GOLDFIELDS LIMITED

St. Andrew Goldfields Limited, a subsidiary of Quebec Sturgeon River Mines Limited, continued the underground development program started in 1983 on its Stock Township gold deposit. Work included 792 feet (241 m) of lateral development on the second (325-foot, 99 m) level, 291 feet (89 m) on the third (450-foot, 137 m) level, and 967 feet (295 m) of lateral development on the fourth (575-foot, 175 m) level. A total of 1556 feet (474 m) of raising was done. Sublevel development totaling 1110 feet (338 m) was done between the first and second levels. Sublevel development totaling 1963 feet (598 m) was done between the third and fourth levels. In 1985, 45 000 feet (13 716 m) of underground drilling was done. The bottom of the shaft is at 884 feet (269 m) below surface in badly faulted and sheared ground. Plans in 1986 may be to deepen the shaft; however, drilling from the fourth level to below the bottom of the shaft will be done to see if the bad ground persists.

In order to hold the ground, the shaft extension must be changed from being rectangular to being a concrete, circular one. No underground development above the fifth level is planned for 1986. However, underground diamond drilling will continue.

Surface diamond drilling, totaling 7300 feet (2225 m), was done on an adjacent property optioned from Esso Minerals Canada and Labmin Resources Limited in lots 5 and 6, concessions I and II, Stock Township. The drilling is to continue into 1986. Encouraging results have been obtained with gold values intersected in rocks similar to those within the mine workings. This could represent a new zone or a faulted extension of the mine zone.

Published reserves are 735 625 tons (667 347 tonnes) at a gold grade of 0.135 ounce per ton (4.69 g/t). The current work is expected to increase this tonnage.

St. Andrew Goldfields Limited has a staff of 9 on the property and the contractors have 30 people (St. Andrew Goldfields Limited, personal communication, 1985; The Northern Miner, July 18, 1985).

ENERGY AND RESOURCES (CAM) LIMITED

Energy and Resources (CAM) Limited, in 1985, obtained an option to evaluate and test tailing deposits totaling 180 million tons (163 million) from nine mines in the Timmins area. These include the Dome; McIntyre; Delnite; Aunor; Buffalo Ankerite; Coniaurum; Paymaster; Preston East Dome; Vipond; Hallnor; and Broulan. Drilling was done in late 1984 and early 1985 on some of these sites. Average grade of these deposits is estimated to be 0.013 ounce gold per ton (0.49 g/t).

Energy and Resources (CAM) Limited is closely associated with Jimberlana Resources which is in the process of buying Noranda Incorporated's share of Pamour Porcupine Mines Limited. In late 1985, Energy and Resources (CAM) Limited reported that a feasibility study is nearing completion on a tailings reclamation project. Mining and milling rates studied are in excess of 250 000 tons (226 796 million tonnes) per month up to a maximum rate of 1.2 million tons (1.08 million tonnes) per month and a recovery of 50% to 60% (The Northern Miner, March 28, October 21, November 25, 1985).

KIDD CREEK MINES LIMITED

Kidd Creek Mines Limited, under their project development department, optioned the former Malga Porcupine gold property in Shaw Township from Gail Resources Limited. Kidd Creek Mines Limited was to spend $300 000 in evaluating the gold-bearing iron formation within six months to earn a 50% interest in the property. Twenty-two diamond-drill holes totaling 3991 feet (1216 m) were drilled to assess the iron formation for open pit mining potential. Poor results were obtained and the property was returned to Gail Resources Limited (The Northern Miner, May 30, 1985; Kidd Creek Mines Limited, personal communication, 1985).

EXPLORATION ACTIVITY

Exploration activity in the Timmins Resident Geologist area remained high in 1985. Almost all of the effort was placed on the exploration for gold in spite of the fact that its price has not improved over the previous year. Extremely weak base-metal prices discouraged everyone except Kidd Creek Mines Limited from conducting base-metal exploration programs. With present metal prices, it is easier to discover an economic gold deposit than an economic base-metal deposit. Most of the exploration expenditures, as in previous years, went into programs in the Abitibi "Greenstone" Belt. Active exploration continued in the "Swayze Belt" as reported by the Swayze Economic Geologist, this volume. Some of the projects carried out in 1985 in that part of the Abitibi Belt which lies within the Timmins Resident Geologist area are briefly described below:

KIDD CREEK MINES LIMITED

Kidd Creek Mines Limited focused their efforts on finding new base-metal deposits to add to reserves of the original Kidd Creek orebody and to keep the company's metallurgical complex in Timmins working at capacity over the long term.

The company also continued to explore for gold as part of an effort to diversify its mineral base. In 1985, base-metal exploration included drilling three diamond-drill holes (1070 m) in Godfrey Township; one hole (646 m) in Jamieson Township; two holes (657 m) in Jessop Township; eight holes (2123 m) in Prosser Township, and four holes (2210 m) in Kidd Township. One of the holes drilled in Kidd Township, was on ground optioned from Chance Mining and Exploration Company Limited to explore the possible faulted off extension of the small mineralized zone previously found.

Kidd Creek Mines Limited gold exploration program included: one diamond-drill hole (250 m) in Bristol Township; ten holes (3279 m) in Hoyle Township; four holes (941 m) in Lennox Township; eight holes (2455 m) in Lucas Township; ten holes (2401 m) in Matheson Township; seven holes (2002 m) in Ogden Township; and two holes (721 m) in Prosser Township.

As well, Kidd Creek Mines Limited carried out other activities in Clergue, Mahaffy, Tully, Carscallen, Reid, Macdiarmid, Wark, Robb, Cody, Whitney, and Tisdale Townships (Kidd Creek Mines Limited, personal communication, 1985).

NEWMONT MINES LIMITED

After spending $3 million in the last three years on gold exploration on optioned Tisdale-Whitney properties, Newmont Mines Limited abandoned the project. Nothing of economic significance was found and most of the options were dropped. Newmont Mines Limited is continuing a regional assessment and compilation of the Timmins area to develop exploration projects. The company examined many property submittals in 1985 (Newmont Mines Limited, personal communication, 1985).

KERR ADDISON MINES LIMITED

Kerr Addison Mines Limited cut 7 miles (11 km) of new grid and completed 14 miles (23 km) of geophysics in Tully Township. Four diamond-drill holes were drilled totaling 655 m. Three holes were drilled into E.M. anomalies and one hole into a high magnetic anomaly. Results were generally negative but one hole intersected anomalous gold values. No further work is planned in Tully Township. Kerr Addison Mines Limited also explored in Montcalm Township. Six line miles (10 km) of geophysics were done to define airborne conductors. Two diamond-drill holes totaling 420 m were drilled into conductors. Nothing of economic significance was intersected (Kerr Addison Mines Limited, personal communication, 1985).

UTAH MINES LIMITED

Utah Mines Limited completed a gold exploration program on claims optioned from R. Poirier in Bristol Township. Geological mapping, geophysical, and geochemical surveys were done. Two holes totaling 488 m were drilled under old trenching which had VLF and I.P. responses to the south. Results were disappointing. The highest core assay returned 270 ppb gold (Utah Mines Limited, personal communication, 1985).

FALCONBRIDGE LIMITED

Falconbridge Limited conducted a diamond drilling program east of the nine workings on their Hoyle Mine property on Whitney Township.

Falconbridge Limited optioned the southeast Deloro and Thorneloe Township properties of Comstate Resources and carried out stripping, sampling, and geological mapping (Falconbridge Limited, personal communication, 1985).

WESTMIN RESOURCES LIMITED

In Bond Township, Westmin Resources Limited extended a previously drilled hole from 229 m to 610 m. A quartz-feldspar porphyry with up to 2% pyrite was intersected (personal observation, 1985).

WESTFIELD MINERALS LIMITED

Westfield Minerals Limited prospected and conducted geological, geophysical, and geochemical surveys on 160 claims optioned from R. Allerston in Bristol Township. The option was subsequently dropped (Westfield Minerals Limited, personal communication, 1985).

ASARCO EXPLORATION COMPANY OF CANADA LIMITED

Asarco Exploration Company of Canada Limited conducted an overburden drill program on their claims in Robb Township early in 1985. A piece of float consisting of quartz carbonate veining and containing gold values was reported in an 1915 Ontario Bureau of Mines Annual Report (Volume 24, Part 3, p.60). The program was designed to test basal till up ice from this occurrence (Asarco Exploration Company of Canada Limited, personal communication, 1985).

B.P. RESOURCES CANADA LIMITED

B.P. Resources Canada Limited, Selco Division, carried out EM 37 and Pulse EM surveys on existing lines in Mann, McCart, Little, and Duff Townships. Some anomalies were located and may be drilled in 1986 (B.P. Resources Canada Limited, Selco Division, personal communication, 1985).

LAC MINERALS LIMITED

Lac Minerals Limited conducted a small geophysical program in Clergue and Sheraton Townships in 1985. The company also continued an exploration program started in 1984 in Fallon and Langmuir Townships doing geological mapping, geophysics, and basal till sampling with a plugger (Lac Minerals Limited, personal communication, 1985).

CLEYO RESOURCES INCORPORATED

Cleyo Resources Incorporated, in 1985, drilled two holes on a property in McArthur Township to investigate two conductors. Geological and geophysical surveys were done in Carscallen Township. An overburden drilling program with a plugger was done over electromagnetic anomalies in Matheson Township (Cleyo Resources Incorporated, personal communication, 1985; various Northern Miner articles, 1985).

COMSTATE RESOURCES LIMITED

Comstate Resources Limited completed a small overburden drilling program in the winter of 1985 on Night Hawk Lake in Cody Township (Comstate Resources Limited, personal communication, 1985).

DIEPDAUME MINES LIMITED

Diepdaume Mines Limited drilled a 305 m hole for geological purposes in the north part of Cody Townships late in 1985 (Diepdaume Mines Limited, personal communication, 1985).

DIPLOMAT RESOURCES INCORPORATED

Diplomat Resources Incorporated conducted a stripping, prospecting, and geological mapping program on the old Novell Porcupine or Excello property in Shaw and Deloro Townships. Old trenches and some old pits were cleaned out and resampled. Some additional trenching was done. A detailed geophysical program was completed. Gold values are found in iron formation and in quartz veining in a carbonate horizon located stratigraphically below the iron formation (K.A. Jensen, Consultant, Timmins, personal communication, 1985).

LOKI RESOURCES INCORPORATED

Loki Resources Incorporated conducted a stripping and sampling program on the western extension of the carbonate horizon which occurs on the Deloro Township property of Puissance Mining Corporation (personal observation, 1985).

MILNER CONSOLIDATED SILVER MINES LIMITED

Milner Consolidated Silver Mines Limited drilled one hole on their property 500 m north of the Davidson Tisdale deposit in Tisdale Township. No economic mineralization was intersected (Milner Consolidated Silver Mines Limited, personal communication, 1985; The Northern Miner, September 30, 1985).

UNITED KINGDOM ENERGY INCORPORATED

United Kingdom Energy Incorporated drilled 28 reverse circulation holes in Macklem Township during early 1985. The company drilled three diamond-drill holes (914 m total) to test the basal till geochemical gold anomalies and investigate a large carbonate alteration zone outlined by bedrock chips obtained from the overburden drilling. An intersection with visible gold, grading 13 g/t Au over 1.46 m, was obtained in one drillhole. A three-year option agreement has been made with Kidd Creek Mines Limited for the property. Kidd Creek Mines Limited is expected to begin exploring the property in mid 1986 (personal observation, drill core, 1985; Wm. MacRae, Consultant, Timmins, personal communication, 1985; The Northern Miner, October 21, 1985).

GOLDEIDT EXPLORATIONS INCORPORATED

Goldeidt Explorations Inc. drilled four diamond-drill holes in Macklem Township, to locate the source of basal till gold anomalies obtained in a reverse circulation drill program two years ago. Anomalous gold values were intersected (M. Pickens, Consultant, Midland Doherty, Toronto, personal communication, 1985).

Other companies and individuals conducting exploration programs in the Timmins area include: Aurelian Developers Limited (diamond drilling on claims optioned from Canreos Minerals (1980) Limited in Brackin Township); A. Amory (diamond drilled a 213 m hole in Price Township); D. Baker and J. Raine (stripping in Neill Township); P. Colbert (Denton, Carscallen Township); Magenta Development Corporation (Pharand Township); E.B. O'Neill (drilling in Whitney Township); J.P. Sheridan (geophysical surveys in Kidd Township); Walker Explorations (Sheraton Township); 655 Group Holdings Limited (Turnbull Township); E.G. Burns (Neill Township).

NORANDA EXPLORATION LIMITED

The biggest exploration effort for Noranda Exploration Limited in the Timmins area is the "Mountjoy Project" located on 224 patented and staked claims in Ogden and Deloro Townships. Noranda Exploration Limited is involved in a joint venture with Stan-west Mining Corporation by which the latter can earn up to 50% interest in the project by supplying $1 000 000 by the end of 1985 and a further $500 000 in 1986. The purpose of this program is to explore the extension of the Porcupine Gold Belt westward from the former Delnite Mine. Extensive diamond drilling, 40 holes totaling 40 000 feet (12 192 m), were drilled in 1985. Twenty of these holes were drilled on the former Desantis Mine property in Ogden Township optioned from L. Bonhomme. Ten holes were drilled in proximity to the mine workings. One hole was reported to have intersected 0.25 ounce gold per ton (8.6 g/t) over 21 feet (6.4 m), 1400 feet (427 m) below surface and below the bottom level of the mine which is 1125 feet (343 m) below surface. A wedged hole drilled off the above hole intersected 0.233 ounce gold per ton (7.9 g/t) across 27 feet (8.23 m) from a gold-bearing albitite dike. Four of the 40 (4125 feet, 1257 m), were drilled on property optioned from Comstate Resources Limited in Deloro Township just to the west of the Delnite Mine.

Other exploration projects completed by Noranda Exploration Limited in 1985 included: an airborne survey in Mann Township; three deep diamond-drill holes in a joint venture with Pamour Porcupine Mines Limited in Macklem Township, and three holes (1000 feet, 305 m) on a property optioned from J. Croxall in Bristol Township. It was announced in 1985 that Noranda Exploration Limited had dropped the option on the Holmer Property in Bristol Township after drilling three holes in 1984 (Noranda Exploration Limited, personal communication, 1985; The Northern Miner, 1985).

DOME EXPLORATION (CANADA) LIMITED

Dome Exploration (Canada) Limited had an active gold exploration program in the Timmins area in 1985. Seven holes totaling 10 000 feet (3048 m) were drilled in the northern part of Bond Township on overburden geochemical anomalies. Results were negative. Dome Exploration (Canada) Limited drilled 12 holes (8000 feet, 2438 m) in Bristol Township for geological purposes and to test electromagnetic anomalies over low magnetic areas. The program will continue in 1986.

The company also conducted an exploration program in Langmuir and Blackstock Townships on ground optioned from Melrose Resources Limited. The program consisted of two diamond-drill holes (1500 feet, 457 m), geophysics, and trenching. An I.P. survey will continue into 1986 (Dome Exploration (Canada) Limited, personal communication, 1985).

COMINCO LIMITED

Cominco Limited continued its aggressive gold exploration program in 1985. The company completed 60 line miles of magnetometer surveys in Tully Township; 14 overburden reverse circulation holes and 4 line miles of geophysics in Evelyn Township; 24 reverse circulation holes, 6 diamond-drill holes, and 8 line miles of geophysics in Matheson Township; 13 reverse circulation holes, 12 diamond-drill holes (6500 feet, 1981 m), and 2 line miles of geophysics in German Township; 7 reverse circulation holes, 1 diamond-drill hole (550 feet, 168 m), and 9 line miles of magnetometer surveys in Stock Township. Plans for 1986 include follow-up diamond drilling over basal till anomalies (Cominco Limited, personal communication, 1985).

LABRADOR MINING LIMITED

Labrador Mining Limited, formerly Hollinger Argus and Hollinger Exploration, closed their exploration division in 1985. Esso Minerals Limited is continuing to carry out some of their joint venture projects. Labrador Mining Limited, in a joint venture with Esso Minerals Limited but acting as operator, drilled five holes in Denton Township in 1985 intersecting pyrite, arsenopyrite with low gold values, and minor alteration (Labrador Mining Limited, personal communication, 1985).

ESSO MINERALS LIMITED

Esso Minerals Limited conducted an exploration program in Thorneloe Township in 1985, which included geological mapping, magnetometer surveys, I.P. surveys, and the drilling of three diamond-drill holes. Drilling will continue into 1986. One hole was reported to have intersected extensive carbonate alteration and anomalous gold values. One hole was drilled in Godfrey Township in late 1985.

Three holes were drilled in Tisdale Township intersecting calcitic alteration, and six reverse circulation holes were drilled in Bond Township. Esso Minerals Limited also conducted geophysical surveys and geological mapping in Godfrey, Turnbull, Carscallen, and Bristol Townships in 1985 (Esso Minerals Limited, personal communication, 1985).

CHEVRON CANADA RESOURCES LIMITED

Chevron Canada Resources Limited spent a large amount of time in 1985 investigating property submittals. Exploration programs included: 11 short diamond-drill holes in Dargavel Township; 20 km of geophysics and two diamond-drill holes in Turnbull Township; an airborne survey in Fournier Township; a small amount of geophysics in Robb Township, and geochemical and lithogeochemical surveys in Muskego Township. In addition, Chevron Canada Resources Limited conducted a stream geochemical program for gold in Whitney, Shaw, Tisdale, and Mountjoy Townships (Chevron Resources Canada Limited, personal communication, 1985).

QUEBEC STURGEON RIVER MINES LIMITED

Quebec Sturgeon River Mines Limited completed 14 600 feet (4450 m) of diamond drilling in 1985 in lots 1, 2, and 3 in concession I and II, Stock Township, lots 11 and 12, concession II, Taylor Township. It was reported that the geology is very complex. However, enough encouragement was received to continue drilling into 1986 (Quebec Sturgeon River Mines Limited, personal communication, 1985).

SWAYZE BELT ECONOMIC GEOLOGIST PROGRAM

INTRODUCTION

The Swayze Belt Economic Geologist Program was initiated in May of 1985. J.C. Ireland was hired as Economic Geologist. The program was designed to encourage exploration activities and to evaluate and document mineral occurrences. The Swayze Belt includes all or part of 49 townships totaling approximately 3500 km^2 (1375 square miles) located 80 km (50 miles) southwest of Timmins, Ontario.

Exploration activities proceeded at a moderate to high level through 1985 with gold as the major target. Over 80% of the area underlain by supracrustal rocks is currently staked and in good standing. Exploration activities have been noted on most of the patented ground in the Swayze Belt, which includes the more extensively developed and previously known gold, base-metal and industrial mineral occurrences in the area.

Twenty-four properties were visited during the 1985 field season. Several field trips were conducted to familiarize new companies and individual prospectors with the Swayze area.

HISTORY

The area has been explored periodically since the early 1900s. The extensive belts of iron formation received some attention around 1910, and during the years 1927 and 1928, some base-metal exploration was carried out in the southwest. Gold was discovered in 1931 by J.G. and J.L. Kenty on what is now the old Kenty Gold Mine property. Following this discovery, considerable prospecting took place in the southern part of the Swayze area, and a number of other discoveries of gold were made. Prospecting continued through the 1930s and again after World War II and into the early 1950s. Many of the known mineral occurrences were discovered during this time. The area received little further attention until the mid to late 1960s when a major upsurge of interest in base metals arose as a result of the Texas Gulf discovery in Timmins. Exploration activity remained moderate until 1980, when the price of gold rose to historic highs. Since that time, extensive exploration has taken place.

Several properties reached the underground development stage. Earliest reported production was from the Halcrow-Swayze Gold Mine which produced 40 ounces of gold from 211 tons of ore at an average grade of 0.19 ounce gold per ton in 1935.

The two largest past-producers in the Swayze area were the Jerome Gold Mine, located in south-central Osway Township (from 1941 to 1943, production totaled 335 060 tons grading 0.17 ounce per ton gold which yielded 56 893 ounces of gold and 15 114 ounces of silver), and the Joburke Gold Mine, located in east-central Keith Township (from 1973 to 1975 and 1979 to 1981, production totaled 302 561 tons grading 0.09 ounce per ton gold which yielded 28 440 ounces of gold). Other documented past producers in the area include the Tionaga (Smith-Thorne) Gold Mine located in south Horwood Township (during 1938 and 1939, 6653 tons averaging 0.35 ounce per ton gold yielded 2299 ounces of gold), and the Kingbridge/Gomak Mine in Chester Township (during 1935 and 1936, 1387 tons at a grade of 0.07 ounce per ton gold yielded 98 ounces of gold). Canadian Crest Gold Mines produced a minor amount of gold in the early 1980s from a few open cuts in Chester Township. No base-metal production has been recorded historically, although M.W. Resources Limited (formerly Shunsby Mines Limited) has reported drill indicated reserves of 2.4 million tons of 2.7% zinc and 0.39% copper.

RECENT DEVELOPMENT

Orofino Resources Limited did little work on their gold deposit in Silk and Horwood Townships in 1985. A decline is planned to enter the former underground workings at depth, but no date has been given for commencement of the work. The company has published drill indicated reserve figures of 1.65 million tons grading 0.14 ounce gold per ton using a cut-off grade of 0.05 ounce gold per ton or 800 000 tons grading 0.21 ounce gold per ton at a cut-off grade of 0.11 ounce gold per ton (Orofino Resources Limited, personal communication, 1985; The Northern Miner, June 21, 1984).

Extender Minerals Limited is currently driving a decline on the former Cryderman or Ravena barite deposits located in southwest Penhorwood Township (Extender Minerals Limited, personal communication, 1985) (*see* "Industrial Minerals", this volume).

EXPLORATION ACTIVITIES IN THE SWAYZE BELT

Exploration activity in the Swayze Belt varied from moderate during the Spring and Fall to high levels during July, August, and December. The high levels of activity at the year end are due largely to the availability of flow-through money.

A brief description of most of the exploration activities carried out in the Swayze area during 1985 is described below.

Carl Creek Resources Limited carried out an extensive program of backhoe stripping and trenching, sampling, and geological mapping on the Kenogaming Township property optioned from Ingamar Explorations Limited. Most of the 1985 stripping was done on the old Johnsmith Mines property to examine induced polarization anomalies. Sampling of the exposed bedrock failed to return significant gold values. One trench, located on the east side of Akweskwa Lake and believed to be the eastward extension of the Dunvegan zone, returned a value of 0.157 ounce gold per ton from a 5 cm wide massive pyrite seam in sheared intermediate to felsic volcaniclastic rocks. Samples from the main Dunvegan zone returned values of up to 0.08 ounce gold per ton and 22% zinc. (M.P.H. Consulting Limited, personal communication, 1985; Resident Geologists Files, Ontario Ministry of Northern Development and Mines, Timmins).

Carlson Mines Limited carried out a sampling program over areas stripped in 1983 in Rollo Township. The property includes the old Cyril-Knight and Aguara showings located south of Ridley Lake. The new sampling program was initiated to re-evaluate a 1983 channel sample that returned an average of 0.25 ounce gold per ton over 1.83 m (6.0 feet) from the Aguara showing (M.P.H. Consulting Limited, Toronto, personal communication, 1985).

Dome Exploration Limited carried out extensive ground geophysical and geological surveys over the central part of Newton Township during 1985. A 3050 m (10 000 feet) diamond drill program was completed in May of this year and Dome Exploration Limited reported a 6.3 m (20.7 foot) intersection averaging 0.18 ounce gold per ton in one hole which was drilled to test an Induced Polarization anomaly. The values occur in a carbonatized rhyolitic porphyry unit (dike or sill?) which intrudes carbonatized mafic metavolanics. A second 3050 m (10 000 foot) diamond-drill program started in November is testing this mineralized zone plus other new targets outlined during the past summer. Dome Exploration Limited holds the option on Newton, Dale, and Coppell Townships from Algoma Talisman Minerals Limited (Dome Exploration Limited, personal communication, 1985; The Northern Miner, May 9, October 7, 1985; personal observations, 1985).

Falconbridge Limited and joint venture partner Chevron Canada Resources Limited carried out a 1500 m (5000 foot) diamond-drill program on their Woman River iron formation property in Heenan and Marion Townships. Gold values were encountered in sulphide-filled cross fractures within the iron formation (Falconbridge Limited; Chevron Canada Resources Limited, personal communication, 1985).

Gogama Resources Limited completed a three hole, 285 m (932 foot) diamond-drill program on their property in Chester Township. Drilling was done to test Induced Polarization anomalies defined in 1984 (R.S. Middleton Exploration Services Incorporated, personal communication, 1985).

Hargor Resources Incorporated has completed ground surveys and a two hole, 250 m (800 foot) diamond-drill program on their Potier Township property. Brecciated magnetite iron formation was encountered in both holes (George Cross Newsletter, May 23, 1985; Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Timmins).

Inco Limited, through their exploration arm, Canico Limited, has reorganized its property situation in the Swayze Belt, giving up a large claim group in Swayze, Denyse, and Dore Townships. Canico Limited also dropped their option on the Burton Prospect in Esther Township after considerable work in 1984. New staking was reported by Canico Limited near the old Olive Gold Mine shaft located in northeast Cunningham Township. Immediately upon aquisition of an option on the Quinterra Resources Limited Sylvanite Creek Property in Tooms Township, Canico Limited, as operator, and Golden Hope Resources Incorporated, a joint venture partner providing financing, began linecutting in preparation for ground survey. An overburden drill is on the property at the time of writing (December 10, 1985). Canico Limited will concentrate their exploration program on the northwest part of the grid which extends into Halcrow Township. This includes a part of the patented claims that make up the former Halcrow Swayze Gold Mine property in Halcrow Township. Regal Petroleum Limited holds the option on the other part of the patented claims group (Canico Limited, personal communication, 1985; Today's Market Line, November 27, 1985, Issue TML 229/85).

Murgold Resources Incorporated carried out a limited exploration program on their Chester Township property. The Gomak shaft has been dewatered and sampled. Vein material in the shaft pillar returned gold values over narrow widths (0.05 to 1.0 m) from surface and from the walls of the shaft. Limited stripping east of the shaft has exposed the vein along strike. Sampling of the Watts Vein was carried out and assays of up to 0.85 ounce gold per ton over two foot (0.6 m) widths were reported. A 175 foot (55 m) long decline is to begin on this vein pending financing. A new vein system was also discovered near the Watts vein (Murgold Resources Incorporated, personal communication, 1985).

Muscocho Explorations Limited drilled a 600 m (2000 foot) five-hole program in December 1985, on the property optioned from Jerome Gold Mines Limited (formerly Osway Explorations Limited) in Huffman and Osway Townships. All holes were drilled in Huffman Township on the north side of Oppeepeesway Lake. Most of the holes were to test mineralized showings on the old Jess-Mac property, but at least one hole tested electromagnetic anomalies farther west. There has been no recent report of work being carried out on the old Jerome Gold Mine located approximately 5 km (3 miles) west of the current drilling (Muscocho Explorations Limited, personal communication, 1985).

Noranda Incorporated (Exploration) was active on several properties in the Swayze area in 1985. On the International Rhodes Resources Limited joint venture property in Greenlaw Township, Noranda drilled eight holes to test gold and base-metal targets. A 215 m hole was drilled off Hotstone Lake to test the junction of two major fault systems, the north-south Hotstone Lake fault, and the east-west fault zone which runs along carbonatized komatiitic flows. The hole intersected a highly altered, silicified, brecciated, hematitic (intrusive?) rock mineralized with pyrite. A total of seven diamond-drill holes were drilled to test geophysical and geochemical base-metal targets on the Sultan Creek zone in east Greenlaw Township. The major target for this drill program was a surface base-metal showing discovered in 1984. Four holes were drilled to test the surface base-metal showing at depth and along strike. Base-metal mineralization was encountered in each of the four holes. Two soil geochemical targets were tested. One hole encountered sphalerite and minor galena mineralization and the other returned only low background values. One hole was collared to test a geophysical conductor. Heavily disseminated to massive pyrite and pyrrhotite was encountered in a lean cherty magnetite iron formation. No economic values were reported from this hole (Noranda Incorporated, personal communication, 1985; personal observations, 1985).

Diamond drilling on the Woman River occurrence in Mallard Township by the Noranda Exploration Limited/Berle Resources Limited Joint Venture intersected gold mineralization in a silicified, pyrite mineralized, porphyry unit within sheared mafic volcanic rocks. Over 1800 m (6000 feet) of drilling was scheduled to be drilled in 1985. Assay results to date from the first six holes include: BE-85-1, 0.147 ounce gold per ton over 3.68 m (12.1 feet); BE-85-3, 0.193 ounce gold per ton over 1.8 m (6.0 feet); BE-85-5, 0.102 ounce gold per ton over 2.8 m (9.1 feet); BE-85-6, 0.155 ounce gold per ton over 3.8 m (12.6 feet) (Noranda Incorporated, personal communication, 1985; The George Cross Newsletter, numerous articles, 1985).

Noranda carried out ground geological, geophysical, and geochemical surveys on their Genoa Township properties. Stripping was carried out on several targets but the results were inconclusive (Noranda Incorporated, personal communication, 1985).

Nu-Start Resources Corporation carried out a three hole, 400 m diamond-drill program east of Bagsverd Lake in Chester Township. No values of economic significance were encountered. The rocks drilled consisted of quartz-carbonate-sericite schist with pyritic zones (encountered in two holes), and chlorite-carbonate tuffs (The George Cross Newsletter, July 24, 1985, No. 142; Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Timmins).

Placer Development Limited completed a five hole, 600 m (2000 feet) diamond-drill program on their Dyment Lake property located in Denyes Township. Two holes, drilled to test induced polarization and electromagnetic targets, intersected pyritic and graphitic argillites within a series of dacitic tuffs. Three holes drilled under the surface exposure of an auriferous quartz vein intersected a dacitic feldspar porphyry, graphitic argillites, and rhyolitic tuffs. The porphyry is carbonatized and contains narrow quartz veins with altered (hematitic) margins containing pyrite. The best assay reported was from hole DEN-85-4 which returned a 0.27 m (0.88 foot) interval from 90.85 m to 91.14 m averaging 11.84 grams gold per tonne (0.345 ounce gold per ton). Placer has subsequently dropped the option on the part of the property drilled and has returned the claims to Messrs. J. Patrie and C.E. Bye (Placer Development Limited, personal communication, 1985; J. Patrie, personal communication, 1985; Resident Geologist's Files, Ontario Ministry of Northern Development and Mines, Timmins).

Quinterra Resources Incorporated is currently active on their Cree Lake property in Swayze Township with Golden Rim Resources Incorporated providing financing. Quinterra Resources Incorporated, as operator, has completed ground surveys and stripping and a diamond-drill program was under way at the time of writing (December 10, 1985).

Quinterra Resources Incorporated has signed a similar agreement with Western Pacific Energy Corporation, who will provide funding for exploration on Quinterra's Garnet Township properties. Quinterra is currently diamond drilling on this ground (Quinterra Resources Incorporated, personal communication, 1985).

Regal Petroleum Limited has completed a 1400 m (4600 foot), 14 hole diamond-drill program on the Halcrow-Swayze Gold Mine Zone (former Belcher Mining Corporation property) in west-central Halcrow Township. Drill targets are based on the results of an extensive trenching and sampling program carried out earlier this year. In the area of trenching, gold is believed to be associated with closely spaced fracture zones filled with pyrite in felsic to siliceous tuffs and pyroclastic units containing small (5 to 15 mm) rhyolitic fragments. The entire felsic package is approximately 60 m thick, but mineralization is confined to narrow shears 0.1 to 2 m wide. The entire sequence is carbonatized and sericitized to varying degrees. A few silicified zones and some quartz veining have been observed elsewhere on the property (David R. Bell Geological Services Incorporated, for Regal Petroleum Limited, personal communication, 1985; personal observations, 1985).

The Sangold Project in Keith Township has completed an extensive stripping and sampling program over a part of the old Hoodoo Lake Gold Mines property. Gold values have been obtained within crosscutting quartz-carbonate veins mineralized with sulphides. These veins occur within two zones of highly foliated and extensively sheared, carbonatized pillowed mafic flows and associated mafic tuffs. Several ages of mafic dikes and sheared porphyry dikes and sills intrude the mafic sequence, cutting the stratigraphy at low angles. A late lamprophyre dike cuts all other rock types observed. The property owner is currently negotiating with a resource company on an option agreement (G. Sanford; M.P.H. Consulting Limited, Toronto; various mining exploration companies, personal observations, 1985).

Storiman Exploration Limited completed a 900 m (3000 foot) drill program on 33 claims optioned from Noranda Exploration Limited in 1984. Drilling was concentrated on the further evaluation of a sheared diorite containing auriferous quartz veins. Two holes intersected "ore grade" mineralization at depths of <90 m (The Northern Miner, January 31, 1985).

Sulpetro Minerals Limited carried out a small diamond-drill program on the old Rundle Gold property located in southeast Newton Township, to test areas away from the known deposit, which has an estimated reserve of 100 000 tons averaging 0.29 ounce gold per ton. Sulpetro Minerals Limited, which was recently sold to Americ Mines Limited, shares ownership of the property 50/50 with Labrador Mining Limited (Hollinger-Argus) who is currently in the process of selling their interest (Sulpetro Minerals Limited, personal communication, 1985).

Swayze Resources Limited carried out a trenching and sampling program on their Swayze Township property. Grab samples and channel samples over narrow widths from the Hopkins number 1 vein contained gold values. Samples were collected from a narrow quartz-carbonate vein system in carbonatized and silicified pillowed mafic volcanic rocks. The best channel sample reported was 0.291 ounce gold per ton over 1.2 feet. One plugger dust sample reportedly assayed 0.61 ounce gold per ton (K.A. Jensen Exploration and Consulting Services, Timmins, personal communication; personal observations, 1985).

Ultrex Petroleum Limited completed a 600 m (2000 foot) diamond-drill program on their Horwood Township property optioned from E.J. Korba of Connaught, Ontario. The property lies east and south of the Charlebois patents, located on the east shore of Horwood Lake. Drilling was done to test induced polarization and electromagnetic targets outlined earlier in the year (North American Mining Exploration Corporation for Ultrex Petroleum Limited, personal communication, 1985).

Utah Mines Limited (Exploration) has completed ground surveys on their property in Keith and Muskego Townships. Follow-up stripping on coincident Induced Polarization/soil geochemical anomalies has exposed a sequence of foliated and carbonatized mafic to intermediate volcanic flows and related volcaniclastic rocks carrying anomalous gold values associated with sulphide mineralization. Utah plans a drill program early in 1986 (Utah Mines Limited (Exploration), personal communication, 1985; personal observations, 1985).

Weaco Resources Limited completed an airborne geophysical survey over its large claim group in Benton and Mallard Townships. Ground surveys were initiated this fall (Weaco Resources Limited, personal communication, 1985).

Other companies and individuals not previously mentioned but actively exploring in the Swayze Belt include: Mr. A. Maskovich (geobotanical survey over three claims in Keith Township); Blue Falcon Mines (geology and geophysical surveys on their properties in Huffman and Osway Townships); Chevron Canada Resources Limited (staking and ground surveys on their Muskego/Foleyet Townships property); Comstate Resources Limited (stripping and geochemical work on their Reeves-Sewell Townships Antimony-Arsenopyrite-gold occurrence); Emerald Isle Resources Incorporated (ground surveys on their Chester-Yeo Townships properties; planning a work program on the former Kenty Mine property in Swayze Township, formerly held by Heron Limited Resources); Folkstone Resources Limited (ground surveys on their property located in Cunningham, Greenlaw, Denyes, and Swayze Townships); Greyhawk Resources Limited (ground surveys on their property in northeast Greenlaw Township); Mr. J. Landers property (stripping and sampling on his Horwood Township claims); Kidd Resources Limited (stripping, sampling on their Chester and Yeo Townships property); Manville Canada Incorporated (ground surveys on properties in Denyes and Penhorwood Townships); Neville Explorations (airborne geophysical survey in Mallard Township); Mr. R. Tremblay property (stripping and trenching on his Sewell Township property); Mr. W. Karvinen (ground surveys on his Penhorwood Township property); and Kidd Creek Exploration Limited (diamond drilled one hole to a depth of 121.9 m (400 feet) in Cunningham Township).

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

In 1985 as in 1984, there were no Precambrian Geology Section programs in the Timmins Resident Geologist area. Ontario Geological Survey activities were limited to work done by the Geophysics/Geochemistry Section on the Night Hawk Geophysical Test Range and to various interdisciplinary studies done on the four townships in this area which fall under the Black River-Matheson Program (BRIM).

GEOPHYSICS/GEOCHEMISTRY SECTION

During 1985, staff of this section continued studies on the Night Hawk Geophysical Test Range. These studies included surveys employing the ELFAST RTX/HL-30 and the recently upgraded MAXMIN III+ frequency domain electromagnetic systems.

This section also completed a correlation of airborne and ground electromagnetics with sonic drilling results in the Black River-Matheson area.

BLACK RIVER–MATHESON (BRIM) PROGRAM

Engineering and Terrain Geology Section

In 1984, as part of the BRIM program, sonic drilling was undertaken in a four by four township block at the western end of the program area. In 1985, fill in drilling was completed in this area which includes Clergue, Stock, Bond, and Sheraton Townships. Results from this drilling will be released in mid-1986.

Mineral Deposits Section

J. Malczak, Geologist, Mineral Deposits Section, continued investigation of the St. Andrew Goldfields deposit in Stock Township. The work in 1985 continued the study initiated in the previous field season. Selected levels of the underground development were examined and sampled to provide more complete information on specific cross-sections.

ONTARIO GEOSCIENCE RESEARCH GRANT PROGRAM

During 1984 and 1985, grant recipients with projects directly related to the Timmins Resident Geologist area are listed below:

Grant 138

Mineralogy and Geochemistry of the Chrysotile Asbestos Deposits of Ontario: A Progress Report on the Stable Isotope and Boron Survey; J. Ozoray, F.J. Wicks, and M.D. Higgins.

Grant 192

Geochemical Exploration for Gold; Ian Nichol, and Gene S. Shelp.

Grant 202

Sulphur Isotope Studies of Archean Gold Deposits; H.P. Schwarcz, and C.E. Rees.

Grant 233

The Dating of Ontario's Gold Deposits; A. Masliwec, Derek York, P. Kubida, and C.M. Hall.

Grant 236

Geological, Fluid Inclusion, and Isotopic (Carbon and Sulphur) Studies of Au-Quartz Carbonate-Pyrite-Scheelite Vein Mineralization and Intrusion-Hosted Cu-(Au-Mo) Mineralization in the Hollinger-McIntyre System, Timmins, Ontario; E.T.C. Spooner, P.C. Wood, D.R. Burrows, A.V. Thomas, and S.R. Noble.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

In 1985, a total of 77 programs were designated for OMEP assistance in the Porcupine Mining Division. Seventy of these programs were in the Timmins Resident Geologist area. Total budgeting expenditures amounted to $29 703 236. Of this total, $21 130 630 are expenditures eligible for OMEP. OMEP tax/grant credit assistance for the Porcupine Mining Division have increased by almost 90% over tax/grant credits for 1984.

7. Kirkland Lake Resident Geologist Area, Northern Region

Howard Lovell[1], Gary Grabowski[2], David Guindon[3], and Alexander Bath[4]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[3]Core Library Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

[4]Economic Geologist, Ontario Ministry of Northern Development and Mines, Kirkland Lake

INTRODUCTION

The Kirkland Lake Resident geologist area coincides with the Larder Lake Mining Division. Assessment work credit assigned in 1985 totaled 460 183, the second most in the history of the Larder Lake Mining Division (*see* Table 7.1). Active claims numbered 23 974, the most ever. According to "The Explore Report . . . " (Gartley 1985), the 1984 expenditures, for the townships that comprise the Kirkland Lake Resident Geologist area, the most recent available, for "outside and general exploration" were $9 890 662, about 17% of the Ontario total. However, this estimate may be low, because the Ontario Mineral Exploration Program (for exploration by only those organizations that do not produce minerals in Ontario) projected expenditures of $13 170 176 for 1985. "Mine and on-property exploration" totaled $1 296 890, about 14% of the Ontario total, and "mine and on-property development" expenditures were $20 393 033, about 10% of the Ontario total. The total value of production (including iron pellets, gold, silver, barite, and serpentine filler) for 1983, the most recent figure available, was $116 247 183 (Weatherson 1985). Thus, mineral resources revenue in the Kirkland Lake Resident Geologist area for a single 12-month period is estimated to total about $150 million.

An interpretation of the Mining Act in 1978, regarding the Bear Island Indian Caution laid in 1973, has for the past eight years prevented the recording of mining claims and consequently prevented most exploration and any possible ensuing production in one-quarter of the Larder Lake Mining Division.

RESIDENT GEOLOGIST STAFF ACTIVITIES

Permanent staff includes: Howard Lovell, Gary Grabowski, and Faye M. Boucher, Secretary. Geological Assistant Todd Beckett worked a nine-month contract. Assistance was provided during various periods by Gordon Fitzgerald, Alex Jovan, and Bill Dennis through the Special Employment Program. Clerical assistance was provided for various periods by Pamela Savarie (Black River-Matheson project) and Gina Viskovich (Experience '85).

The Black River-Matheson project employed Alex Bath as Economic Geologist, Nicholas Cox (5 months) as Geological Assistant, and Data Folio Geologist Kamal Kalicharran. Two groups of ten Junior Rangers, for one week each, stripped soil to improve bedrock exposures for field trips in the Matheson and Larder Lake areas.

Activities of the Resident Geologist Office included:

1. responding to 2400 inquiries from exploration, mining and government personnel, and the general public.
2. preparing 44 reports on mineral property examinations, diamond drill logs, field trips, and technical papers.
3. guiding 11 geological field trips to Kirkland Lake-Larder Lake area gold occurrences by groups of mineral explorationists, government, university, and foreign geologists, and two Ontario Ministry of Natural Resources Junior Ranger camps.
4. responding to Road Proposals and Forest Management Agreements, Mining Rights Withdrawals, Mining Hazard Lands reviews, etc.
5. indexing and filing for ready retrieval the assessment work representing 460 183 "man days".
6. indexing and filing 200 additional articles in the technical library, which now fills six filing cabinets.
7. attending Canadian Institute of Mining and Metallurgy symposia, local executive, local and District Three Council and (or) local meetings at Kirkland Lake, Cobalt, Timmins, and Ottawa.

MINING ACTIVITY

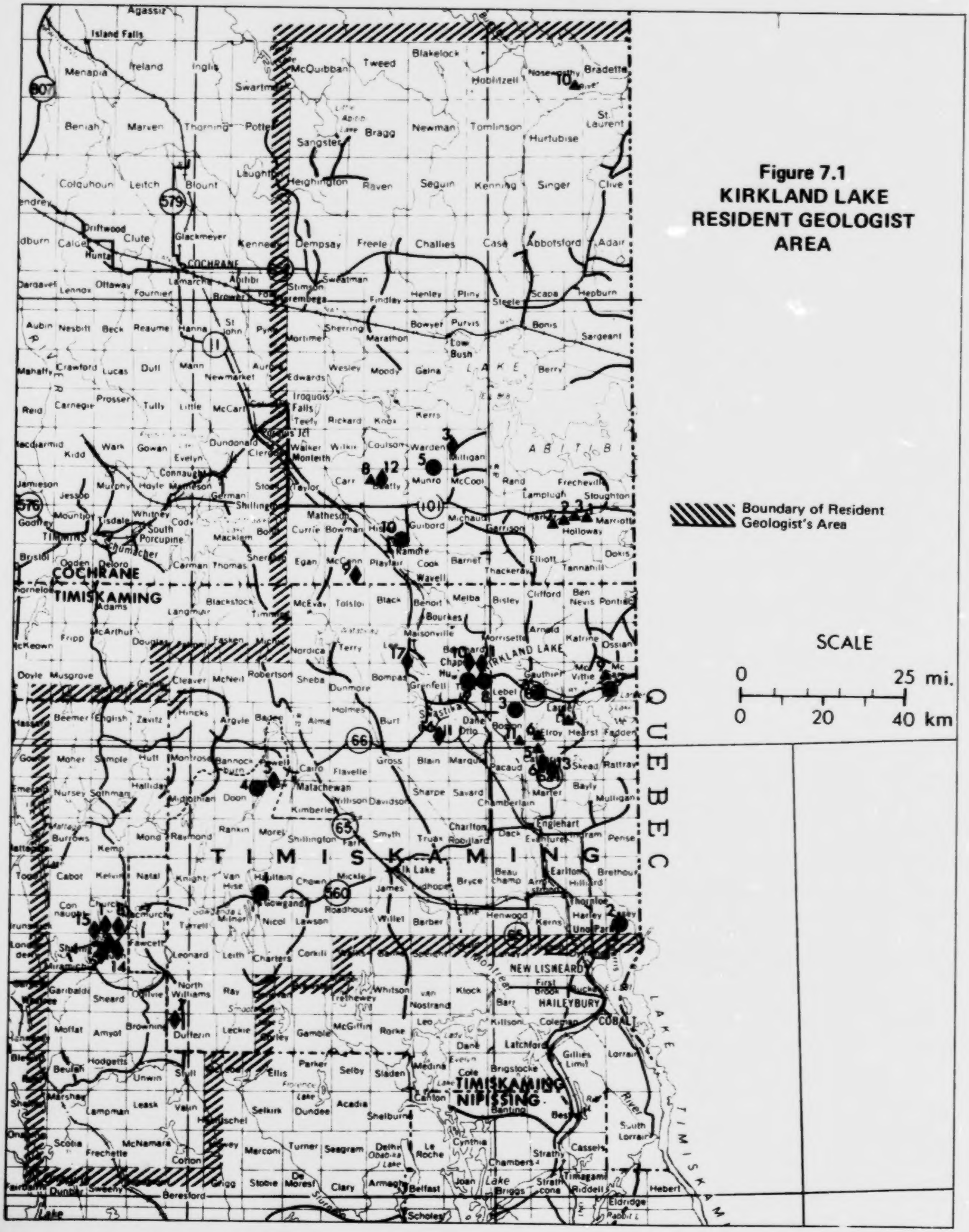
During 1985, ten mines operated in the Kirkland Lake Resident Geologist area, five producing gold and by-product silver, two producing and one developing silver and by-product cobalt, one producing iron ore pellets, one producing barite, and one producing serpentine filler. In addition, a shaft is being sunk at one developing gold mine. Total gold production in the Larder Lake Mining Division by the end of 1984 is shown in Table 7.3.

Lake Shore Mines Limited continued mining its crown pillar for gold-silver ore via a scoop tram decline ramp, and renovated No. 5 shaft to the 1400-foot level, with the possiblity of eventually mining down to the 3950-foot level. Proven underground reserves (Canadian Mines Handbook, 1985-86) are 312 000 tons averaging 0.35 ounce gold per ton.

At the Macassa gold-silver mine of Lac Minerals Limited, the planned deepest single-lift vertical shaft in the western hemisphere (ultimate depth 7275 feet or 2205 m), reached more than 6600 feet (2000 m) deep.

The McBean gold-silver mine, owned by Inco Limited and Queenston Gold Mines Limited and operated by Inco Limited, continued open pit production and milling of gold-silver ore.

Argentex Resource Exploration Corporation intersected 30 m of anomalous gold deep hole drilling,



Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km
QUEBEC
TIMISKAMING
COCHRANE
KIRKLAND LAKE
NEW LISKEARD
HAILEYBURY
COBALT
TIMMINS
MATHESON
TIMISKAMING NIPISSING
LAKE ABITIBI
LAKE TIMISKAMING

Figure 7.1
KIRKLAND LAKE
RESIDENT GEOLOGIST
AREA

● Producing Mines

1. Agnico-Eagle Mines Limited Castle-Tretheway Mine	Ag, Co
2. Agnico-Eagle Mines Limited Langis Mine	Ag, Co
3. Dominion Foundaries and Steel Company Limited Cliffs of Canada Limited Adams Mine	Fe
4. Extender Minerals of Canada Limited	Barite
5. Hedman Resources Limited	Serpentine Filler
6. Inco Limited - Queenston Gold Mines Limited McBean Mine	Au, Ag
7. Kerr Addison Mines Limited	Au, Ag
8. Lac Minerals Limited Lake Shore Mine	Au, Ag
9. Lac Minerals Limited Macassa Mine	Au, Ag
10. Pamour Porcupine Mines Limited Ross Mine	Au, Ag, Cu

▲ Properties Under Major Evaluation

1. Argentex Resource Exploration Corporation	Au
2. Barrick Resources Corporation	Au
3. Canamax Resources Incorporated	Au
4. Falconbridge Limited	Au
5. Goldbrook Explorations Incorporated	Au
6. Golden Shield Resources Limited	Au
7. Lenora Exploration Limited	Au
8. Maude Lake Gold Mines Limited	Au
9. McGarry Resources Incorporated	Au
10. Newmont Exploration of Canada Limited	Au, BM
11. Shenandoah Resources Limited	Au

◆ Property Visits

1. R. Annett and R. Ferguson	Gold Occurrence
2. E.A.M. Armstrong	Gold Occurrence
3. Bay Resources and Services Incorporated	Gold Prospect
4. B. Bolduc	Gold Prospect
5. British Matachewan	Gold Occurrence
6. Daly	Gold Prospect
7. R. Ferguson and R. Annett	Barite and Copper Occurrence
8. Gosselin	Gold Prospect
9. D. Hyde and L. Hubert	Gold Occurrence
10. Kirkland Basin	Gold Prospect
11. Lake Shore Mines Limited	Gold Producer
12. Maude Lake Gold Mines Limited	Gold Producer
13. Moncrieff	Gold Prospect
14. Neelands-Thompson	Gold Occurrence
15. Pacesetter	Gold Occurrence
16. F. And P. Rivard and L. Raitanen	Gold Occurrence
17. C. Shea	Gold Occurrence

TABLE 7.1

SUMMARY OF CLAIMS RECORDED AND ASSESSMENT WORK CREDIT

Year	Claims Recorded	Claims Cancelled	Claims Active	Diamond Drilling (Man Days)	Geophysical Surveys (Man Days)	Geological Surveys (Man Days)	Total Man Days
1985	7,558	5,011	23,974	95,076	276,646	19,517	460,183
1984	7,943	4,492	21,397	93,946	245,542	44,113	473,820
1983	8,354	3,866	17,946	121,213	98,366	15,233	304,770
1982	3,253	5,218	13,458	99,526	133,511	17,926	313,690
1981	5,498	2,697	15,423	69,906	125,459	19,536	247,087
1980	6,299	1,834	12,622	64,454	115,031	10,981	209,357
1979	4,261	1,452	8,157	29,714	25,352	4,990	68,763
1978	1,710	2,065	5,248	32,602	38,100	8,887	87,144
1977	1,826	2,334	5,703	37,101	45,436	1,820	98,992
1976	2,350	2,979	6,712	47,724	42,338	6,220	102,936
1975	2,916	5,010	7,341	45,880	38,047	6,738	98,624
1974	4,757	2,296	9,435	40,678	55,716	4,441	110,165
1973	3,250	3,214	6,974	34,113	35,811	8,150	92,616
1972	3,253	4,740	6,781	39,371	52,351	3,358	106,026
1971	4,065	3,846	8,268	29,433	48,785	4,764	96,047
1970	4,315	3,704	8,049	25,683	28,683	4,133	73,157
1969	3,404	5,273	7,438	50,892	45,713	15,829	130,185
1968	4,171	7,909	9,307	74,649	82,637	5,799	180,437
1967	5,450	7,341	13,045	79,172	29,073	4,032	143,600
1966	7,606	11,101	14,936	117,544	30,971	8,050	182,352
1965	9,331	6,906	18,431	123,129	88,259	6,530	257,029
1964	12,842	3,884	22,912	77,807	32,644	11,725	149,198
1963	4,710	3,895	13,954	95,696	16,241	4,226	138,627
1962	4,675	4,028	13,139	63,003	5,494	5,099	97,219
1961	3,749	4,451	12,492	47,862	5,494	1,118	79,219
1960	5,024	6,747	13,194	75,123	7,296	4,751	104,632
1959	6,419	5,594	14,917	22,947	3,792	1,404	80,322
1958	8,582	7,108	14,902	37,381	7,481	1,941	66,783
1957	4,664	8,212	12,618	95,934	12,593	3,948	139,891
1956	9,673	3,594	16,666	77,879	20,982	6,693	130,894
1955	4,182	3,999	10,087	75,561	3,389	3,529	105,925

TABLE 7.2 . MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Preliminary Maps - Geological Series

P2734 P2949
P2735 P2950
P2848
P2860
P2861

Maps - Geochemical Series

80757

Coloured Maps

2472

Miscellaneous Reports

MP77 MP125
MP122 MP126
MP123 MP127
Video Census Series 4

Open File Maps

OFM 12
OFM 13
OFM 32

Open File Reports

OFR 5540
OFR 5546
OFR 5547
OFR 5553
OFR 5559

Mineral Resources Branch Publications

MPBP 19
MPBP 20
MPBP 21
MPBP 22

Geological Data Inventory Folios

GDIF 264 GDIF 269
GDIF 265 GDIF 270
GDIF 267 GDIF 271
GDIF 268 GDIF 273

down dip from the Canamax Resources Incorporated "Mattawasaga" zone on the Argentex 50-claim property in Holloway Township.

Barrick Resources Corporation diamond drilled several thousand metres delineating the McDermott gold discoveries in Holloway Township and exploring nearby claims in Harker Township, and began sinking a 1400-foot (425 m) shaft to access the main ore zone. Reported reserves are more than 1.3 million tons averaging 0.18 ounce gold per ton (The Northern Miner, November 25, 1985).

Canamax Resources Incorporated and affiliated Bruneau Mining Corporation diamond drilled several thousand metres. Several of the holes were drilled at the Canamax gold discoveries in Holloway Township.

Falconbridge Limited diamond drilled the Mitchell-Hearst claims of Many Metals Mines Limited for gold.

Goldbrook Explorations Incorporated de-watered the upper two levels of the Gold Hill Mine in Catharine Township.

Golden Shield Resources Limited diamond drilled 1600 m and began de-watering the shaft at the Catharine Township gold past producer of Mirado Nickel Mines Limited.

Lenora Explorations Limited diamond drilled in the known gold-bearing stratigraphic zone on Golden Harker claims.

Maude Lake Gold Mines Limited diamond drilled additional holes at its Beatty Township "Argyll" gold deposit and blasted and sampled (by means of a sampling tower) the main gold zone that reaches surface.

McGarry Resources Incorporated diamond drilled its McGarry Township gold prospect.

Newmont Exploration of Canada Limited diamond drilled in Bradette, Hoblitzell, and Noseworthy Townships on the Ontario extension of Quebec's Casa-Berardi gold-bearing stratigraphic zone. Hole 85-A-8 intersected a cherty volcanic formation and returned values of 0.116 ounce gold per ton over 25 feet including an 8-foot section grading 0.27 ounce gold per ton (The Northern Miner, June 20, 1985).

Shenandoah Resources Limited diamond drilled and trenched several properties in Boston, McElroy, Pacaud, and Catharine Townships.

DRILL CORE LIBRARY

The Drill Core Storage Library (Lithotheque) for the Larder Lake Mining division was opened in June of 1984. At present, 122 866.4 m of core are stored, representing 167 551.9 m of drilling.

In 1985, approximately 30 150 m of drill core were collected, catalogued, and stored. Figure 7.2 shows the location of the drillholes from which the core has been stored in the library. Table 7.5 lists a summary of core stored for each township. As of December 1, 1985, users and inquiries numbered 367.

The capacity of the library is approaching the limit; to delay reaching capacity, some core, particularly from areas of high density drilling, will be moved to an exterior box-on-box site, to be stored on pallets. In general, one out of every three or four holes will remain in the library, with the remainder stored outside the library.

The Drill Core Library issues quarterly catalogues listing all drill core collected. Supplements listing new additions are sent out at the end of each intervening month.

Assistance at the Core Library was provide by: F. Kiernicki, Geological Assistant; A. Charbonneau, D. Bruce, G. Fitzgerald, M. Shortt, and G. Pelletier, Mining Sector Works Program; and M. Gelinas, Ontario Youth Corps Program.

The Core Library is located 5 km west of Kirkland Lake on the southern side of Highway 66, at the Ontario Ministry of Natural Resources District Office. Persons wishing to examine or donate core, or wishing to receive catalogues and updates should telephone (705) 642-3222 Ext. 169, or write to:

Drill Core Library

Ontario Ministry of Northern Development and Mines

P.O. Box 129

Swastika, Ontario

P0K 1T0

OPERATION BLACK RIVER–MATHESON (BRIM)

INTRODUCTION

Operation Black River-Matheson (BRIM) is a multidiciplinary geoscience program focused on a 40-

township block extending from Night Hawk Lake eastward to the Ontario-Quebec interprovincial boundary (Figure 7.3). The program has been designed to stimulate the economy of Northern Ontario in the long term via mineral exploration incentives provided through development of an exploration database. This database will ideally contribute to the discovery of mines in the area. The goals of the five-year program (now in its third year) are being realized through contributions from the Engineering and Terrain Geology, Geophysics/Geochemistry, Precambrian, and Mineral Deposits Sections of the Ontario Geological Survey and the Kirkland Lake and Timmins Resident Geologist offices.

GENERAL GEOLOGY

The BRIM area is located in the Superior Structural Province of the Canadian Shield and is underlain by Early Precambrian (Archean) metamorphosed supracrustal and plutonic rocks of the Abitibi "Greenstone" Belt. Middle Precambrian (Huronian) sedimentary rocks unconformably overlie the Early Precambrian rocks in one part of the area. Overburden, consisting mainly of Pleistocene tills, esker deltaic sands, and lacustrine varved clays is present over the great majority of bedrock surface. Local bedrock geology is dominated by sub-greenschist to greenschist facies, volcanic and sedimentary rocks which have been intruded by ultramafic to felsic sills, stocks, and batholiths, and volumetrically minor diabase dikes. Two major east-west trending regional faults traverse the area: the Pipestone Fault (and its extension to the east) and the Porcupine-Destor "Break". The Porcupine Destor "Break" is a structurally complex fault zone which constitutes a major structural and lithologic discontinuity along much of its extent within the BRIM area.

Recent mapping in this part of the Abitibi Belt (Jensen and Langford 1985) indicated that the volcanic stratigraphy may be subdivided into a series of major cycles, each of which is characterized by lower, middle, and upper parts of, respectively, dominantly komatiitic, dominantly tholeiitic, and dominantly calc-alkalic affinity. Regionally, lithologies present in the BRIM area correspond to the upper part of volcanic cycle II (calc-alkalic Hunter Mine Group) and to the lower (komatiitic Stoughton-Roquemaure Group), middle (tholeiitic Kinojevis Group), and upper (calc-alkalic Blake River Group and alkalic Destor-Porcupine Complex) parts of volcanic cycle III (MERQ-OGS 1983).

ONGOING ACTIVITIES

The surficial geology of BRIM area has been mapped at a scale of 1:50 000 by Quaternary geologists of the Engineering and Terrain Geology Section of the Ontario Geological Survey. The release of 1:50 000 scale Quaternary Geology maps of the Matheson (Vagners 1984) and of the Porquis Junction, Watabeag River, and Lightning River areas (Richard and McClenaghan 1985a, 1985b; Vagners and Courtney 1985; Richard 1984) complements previous mapping at the same scale in the Magusi River (Baker *et al.* 1982) and Ramore (Baker *et al.* 1980) areas.

Data pertaining to gold grain distribution (Baker, Steele, McClenaghan, and Fortescue 1984) and preliminary results of bedrock analysis (Jensen *et al.* 1985) from the 1984 Ontario Geological Survey sonic overburden drilling program have been released. Commencing in January 1986, data sheets containing additional information relating to sonic drill cores recovered during 1984 are anticipated to be released. The data sheets will include such information as graphic logs with accompanying interpretation; the number, size, and shape of gold grains recovered; geochemistry of minus 250 and minus 10 mesh fractions; and mineralogy and geochemistry of heavy minerals. Results of the 1984 backhoe sampling program (Baker, Steele, and Fortescue 1984) are also expected to be released in data sheet format during Spring 1986.

Ontario Geological Survey Open File Reports pertaining to sonic drilling methodology and heavy mineral processing (cf. Baker, Steele, and McClenaghan 1985) as well as to the mineralogy and geochemistry of the 1984 sonic drilling bedrock samples are anticipated to be released in January and March/April 1986, respectively.

Ontario Geological Survey Quaternary Geologists continued the overburden drilling and backhoe-assisted trenching program begun during 1984 (Baker, Steele, and McClenaghan 1985). Preliminary interpretation of bedrock samples recovered during the course of this drilling as well as the distribution of gold grains within the overburden sections of the core are expected to be released in March 1986 (cf. Baker, McClenaghan, and Steele 1985).

Geophysicists of the Geophysics/Geochemistry Section of the Ontario Geological Survey completed a regional gravity survey in Northern Ontario which included the southern half of the BRIM area (Gupta *et al.* 1984; cf. Gupta 1984). Results of the survey are expected to be released in the near future. An evaluation of the effectiveness of using electromagnetic measurements to estimate the thickness of Quaternary overburden in the BRIM area appeared late in 1985 (Pitcher 1985).

TABLE 7.3 . GOLD PRODUCTION FROM ALL MINES IN ONTARIO'S LARDER LAKE MINING DIVISION TO END OF 1984 (COMPILED BY KIRKLAND LAKE RESIDENT GEOLOGIST OFFICE)

Mine	Township	Tons Milled	Production (oz. Au)	(oz. Ag)
Aljo	Beatty	2,333	42	5
American Eagle	Munro	60	40	nil
Argyll	Beatty	25	30	nil
Ashley	Bannockburn	157,076	50,123	7,644
Baldwin	Eby	81	43	81
Barry Hollinger	Pacaud	267,741	77,000	8,502
Bidgood	Lebel	586,367	160,184	72,468
Blue Quartz	Beatty	500	81	33
Bourkes	Benoit	1,298	277	50
Canadian Arrow	Hislop	279,593	17,045	nil
Cathroy Larder	McElroy	22,250	3,227	993
Chesterville	McGarry	3,260,439	358,880	19,371
Croesus	Munro	5,333	14,859	1,423
Ethel Copper	James	8,500	69	2,484
Gateford (Swastika)	Teck	103,684	30,068	nil
Golden Summit	Maisonville	737	57	nil
Gold Hill	Catharine	4,616	660	nil
Gold Pyramid	Guibord	175	36	nil
Hudson-Rand	Teck	6,496	483	143
*Kerr Addison	McGarry	37,203,914	10,135,662	563,958
Kerr Addison (Murphy)	Garrison	70,000	9,000	nil
Kirkland Lake	Teck	3,140,283	1,172,955	130,579
Kirkland Townsite	Teck	4,230	1,921	168
Laguerre	McVittie	40,514	7,568	1,383
*Lake Shore	Teck	17,010,083	8,543,601	1,955,132
*Macassa	Teck	5,905,835	2,583,157	399,115
Matachewan Consolidated	Powell	3,525,200	378,101	133,210
Miller Independence	Pacaud	31	59	70
Moffat-Hall	Lebel	16,388	4,780	1,149
Morris Kirkland	Lebel	127,253	16,999	29,754
New Telluride	Skead	104	62	50
Omega	McVittie	1,615,081	214,098	29,290
Queenston	Gauthier	1,054	177	nil
*Queenston-INCO (McBean)	Gauthier	126,636	9,002	nil
Ronda	Macmurchy	24,592	2,727	4,830
*Ross	Hislop	5,826,000	913,216	1,511,661
Ryan Lake	Powell	184,790	1,352	36,141
Stairs	Midlothian	15,835	3,573	1,767
Sylvanite	Teck	5,049,536	1,674,808	337,956
Teck Hughes	Teck	9,565,302	3,709,007	501,657
Toburn	Teck	1,186,316	570,659	135,238
Tyranite	Tyrrell	223,810	31,352	4,860
Upper Beaver	Gauthier	531,067	140,709	3,512
Upper Canada	Gauthier	4,648,984	1,398,291	589,696
Wright Hargreaves	Teck	9,934,327	4,821,296	853,643
Young-Davidson	Powell	6,213,272	585,690	131,939
Total		116,897,705	37,612,958	7,433,192

*Producer in 1984

TABLE 7A ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

ABBREVIATIONS

AEM	Airborne Electromagnetic Survey	Fe	Iron	rTr	Rock Trenching
Ag	Silver	Gc	Geochemical Survey	SA	Sampling, Assays
AMag	Airborne Magnetic Survey	GL	Geological Survey	SP	Self Potential Survey
ARad	Airborne Radiometric Survey	HLEM	Horizontal Loop Electromagnetic Survey	STr	Soil Trenching
Assess	Assessment Work	IP	Induced Polarization Survey	UG	Underground Work
Au	Gold	Mag	Magnetic Survey	VEM	Vertical Loop Electromagnetic Survey
BM	Base Metals	OMEP	Ontario Mineral Exploration Program		
Co	Cobalt	OVD	Overburden Drilling	VLF-EM	Very Low Frequency Electromagnetic Survey
CS	Core Samples	Rad	Radiometric Survey		
D	Donation	Res	Resistivity Survey	Mo	Molybdenum
DD	Diamond Drilling	RS	Remote Sensing		

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Abbotsford Adair	32E/04	Gold Hill Res. Inc. "Double A Property"	Au	Assess	DD (3) 935' SA Gc GL	1984 1984	 2.7494	
Abbotsford	32E/04	Minerex Res. Ltd.	Au	Assess	AEM AMag	1985	2.7934	
Abbotsford, Case Kenning, Singer	32E/04	Morgan Minerals Inc.	Au	Assess	AEM-VLF AMag	1984	2.7397	
Adair	32E/04	Gold Hill Res. Inc. "Double A Property"	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Alma	42A/02	587375 Ontario Inc.	Au	Assess D	DD (1) 302' CS	1984 1985		
Alma	42A/02	Sunfire Expl. Inc.	Au	Assess	DD (3) 96' SA	1984		
Argyle, Hincks Montrose	41P/15 42A/02	Canamax Resources Inc. "Montrose 1"	Au	Assess	AMag AEM	1984	2.7335	
Argyle	42A/02	Fox, P.	Au	Assess	VLF-EM	1984	2.7260	
Argyle Hincks	42A/02	Johns-Manville Canada Inc. "McGill Group"	Au	Assess	GL Rad DD (3) 368'	1984 1985	2.7583	
Argyle, Bannockburn	41P/15 42A/02	Liversage, J.	Au	Assess	Mag	1984	2.7345	
Argyle Bannockburn	41P/15 42A/02	Marjel Resources Inc.	Au	Assess	VLF-EM	1985	2.8039	
Argyle	42A/02	Melrose Resources Inc.	Au	Assess	Mag	1984	2.7483	
Argyle, Bannockburn Hincks	41P/15 42A/02	Petromet Res. Ltd. "Ashley Property"	Au	Assess	DD (5) 1,368	1984	2.7829	
Arnold Morrisette	32D/04	Gleeson-Rampton Expls. "Alfie Creek Claim Group"	Au	Assess	Mag VLF-EM	1985	2.8255	
Arnold	32D/04 32D/05	Lac Minerals Ltd. "Grid A18"	Au	Assess	Mag	1985	2.8326	
Arnold, Gauthier Katrine, McVittie	32D/04 32D/05	Lac Minerals Ltd. "Grid A47"	Au	Assess	Mag	1985	2.8328	
Arnold	32D/04	Link, T.; Merrick, A.	Au	Assess	DD (2) 542'	1985		
Asquith	41P/11	Johnston, H.D.	Au	Assess	STr rTr	1967		
Asquith	41P/11	Onitap Resources Inc. "Gosselin Property"	Au	Assess	DD (3) 988'	1985		
Asquith	41P/11	Onitap Resources Inc. "Jessie James Prop."	Au	Assess	Gc GL	1984	2.7130	
Asquith	41P/11	Onitap Resources Inc. "Stewart-Seager Lake Property"	Au	Assess	Mag VLF-EM GL Gc	1984 1984	2.7495 2.7549	
Asquith, Churchill	41P/11	Patino Mines Ltd. "Shiningtree 1 Prop."	Au	Assess	CS	1984		
Asquith	41P/11	Southgate Res. Ltd.	Au	Assess	Mag VLF-EM GL DD (1) 206'	1985 1985 1985	2.8089 2.8412	
Baden	42A/02	Shiningtree Gold Res. Inc. "Arbade Group"	Au	Assess	STr	1984		
Bannockburn	41P/15	Johns-Manville Canada Inc. "Galer Group"	Au	Assess	GL Rad SA	1984	2.7242	
Bannockburn	41P/15	Kiernicki, F.	Au	Assess	STr	1984		
Bannockburn	41P/15 42A/02	Liversage, J.	SEE	UNDER	ARGYLE TOWNSHIP			
Bannockburn	41P/15 42A/02	Marjel Resources Inc.	SEE	UNDER	ARGYLE TOWNSHIP			

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Bannockburn	41P/15 42A/02	Pefromet Res. Ltd. "Ashley Property"	SEE	UNDER	ARGYLE TOWNSHIP			
Barnet, Garrison Michaud, Thackeray	32D/05 42A/08	Noranda Expl. Co. Ltd. "Barnet 1-79"	Au	Assess	AMag AEM	1985	2.8228	
Barnet Thackeray	32D/05 42A/08	Peter Island Res. Inc.	Au	Assess	VLF-EM Mag	1985	2.7976	
					Gc GL	1985	2.7949	
					GL VLF-EM	1985	2.8183	
					DD (3) 903'	1985		
Barnet Cook, Guibord Melba, Michaud	42A/08	St. Joe Canada Inc.	Au	Assess	SA	1983	2.7681	
				Assess	DD (6) 4603'	1985		
				OMEP	GL Mag IP	1983		
Beatty	42A/09	Canamax Resources Inc. "Beatty 7"	Au	Assess	GL	1985	2.7926	
Beatty Coulson	42A/09	Dalhousie Oil Corp.	Au	Assess	Mag VLF-EM	1983	2.7303	
Beatty	42A/09	Kruk, T.	Au	Assess	DD (1) 121'	1960		
					rTr	1960		
					STr	1961		
Beatty	42A/09	Lalonde, D.	Au	Assess	STr	1984		
Beatty	42A/09	Maude Lake Gold Mines "Ltd. "Bennett-Beatty Group"	Au	Assess	Mag VLF-EM Rad GL	1985	2.7670	
Beatty	42A/09	Maude Lake Gold Mines Ltd."Salve Lake Group"	Au	Assess	DD (2) 968'	1984		
					GL	1985	2.7784	
Beatty	42A/09	Maude Lake Gold Mines Ltd."Salve West Group"	Au	Assess	DD (2) 1,766'	1985		
Beatty	42A/09	Parsons, G.E.	Au	Assess	STr	1984		
					Rad	1985	2.7670	
					SA	1985	2.8342	
					STr	1985		
Beatty	42A/09	Ward, J.T.	Au	Assess	VLF-EM	1984	2.7575	
Ben Nevis	32D/05	Beaudry, R.	Au	Assess	STr rTr	1966		
Ben Nevis	32D/05	Roche, J.	Au	Assess	rTr STr	1960		
Benoit	42A/08	Lacana Mining Corp. "Johnson Claims"	Au	Assess	VLF-EM Mag	1985	2.8068	
Benoit	42A/08	Nokta Canada Ltee.	Au	Assess	STr	1967		
Benoit, Black Cook, Playfair	42A/08	Noranda Expl. Co. Ltd. "Playfair Group"	Au	Assess	AEM AMag	1985	2.8280	
Benoit, Bernhardt Maisonville, Melba	42A/01 42A/08	Noranda Expl. Co. Ltd. "Wolf Lake Group"	Au	Assess	AMag AEM-VLF	1985	2.8280	
Benoit	42A/08	Rodholm, C.	Au	Assess	SA	1984	2.7063	
					STr	1985		
Bernhardt Teck	42A/01	Ansara, N.A.	Au	Assess	rTr	1960		
Bernhardt Maisonville	42A/01	Cedar Ridge Expl. Ltd.	Au	OMEP	STr rTr SA	1982	63.4190	
Bernhardt	42A/01 42A/08	Noranda Expl. Co. Ltd. "Wolf Lake Group"	SEE	UNDER	BENOIT TOWNSHIP			
Bernhardt Maisonville	42A/01	Premier Expl. Inc. "Blue Mountain Prop."	Au	Assess	STr	1985		
					Mag	1985	2.8095	
					SA STr rTr	1985	2.8459	
					Mag	1985	2.8551	
Bernhardt	42A/01	St. Jean, P.	Au	Assess	STr	1984		
Beulah Hodgetts	41P/03 41P/06	Field Resources Ltd.	Au	Assess	AMag AEM	1985	2.8212	
Beulah Garibaldi, Moffat	41P/06	Harlin Resources Ltd. "Opikinimika Lake Project"	Au	Assess	AMag AEM	1985	2.8211	
Bisley Melba	42A/05 32D/05	Falconbridge Copper Corp."Rosario Option"	Au	Assess	Gc GL	1981	2.7403	
Bisley	32D/05	Lac Minerals Ltd. "Grid 7"	Au	Assess	Mag	1985	2.8323	
Bisley	32D/05	Lac Minerals Ltd. "Grid B14"	Au	Assess	Mag	1985	2.8325	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Bisley	32D/05	Lac Minerals Ltd. "Grid 817"	Au	Assess	Mag	1985	2.8324	
Black	42A/08	Bruno, R.	Au	Assess	STr rTr	1985		
Black	42A/08	Farakel Company	Au	Assess	VLF-EM DD (5) 1,832'	1985 1985	2.7782	
Black	42A/08	Lenora Expl. Ltd.	Au	Assess	VLF-EM Gc	1984	2.7326	
Black	42A/08	Noranda Expl. Co. Ltd."Playfair Group"	SEE	UNDER	BENOIT TOWNSHIP			
Bompas, Grenfell Lee, Maisonville	42A/01	Glen Auden Res. Ltd. "Grenfell Property"	Au	Assess	AEM-VLF AMag GL	1985 1985	2.8391 2.8629	
Boston McElroy	31M/13 32D/04	Bishop, J.	Au	Assess	STr	1985		
Boston, Catharine McElroy, Pacaud	31M/13 32D/04	Perron, A.H. "Catharine Six Group"	Au	Assess	STr	1985		
Boston Pacaud	31M/13 32D/04	Shiningtree Gold Res. Inc."Canico-Shiningtree Joint Venture"	Au	Assess	GL Gc DD (6) 1,232'	1984 1984	2.7402 2.7402	
Boston	32D/02	Shiningtree Gold Res. Inc."The West Group"	Au	Assess	DD (1) 218'	1984		
Bowman	42A/07	Asarco Exploration Co. of Canada Ltd. "Cook Project"	Au	Assess	OVD (6) 550'	1984	2.7238	
Bowman	42A/08	Asarco Exploration Co. of Canada Ltd. "Russell Creek Group"	Au	Assess	OVD (13) 960' Mag VLF-EM GL	1985 1985	2.8504 2.8491	
Bowman Currie	42A/08	Asarco Exploration Co. of Canada Ltd. "Vimy Ridge Project"	Au	Assess	DD (1) 557' CS	1984 1985		
Bowman Currie	42A/07 42A/08	Kidd Creek Mines Ltd.	Au	Assess	OVD (39) 2,048'	1985	2.8339	
Bradette	32D/12	Canadian Nickel Co. Ltd.	Au	Assess	OVD (19) 1,757'	1985	2.8075	
Bradette Noseworthy	32E/05 32E/12	Newmont Exploration of Canada Ltd.	Au,BM	Assess	DD (9) 8,035' SA OVD (43) 3,953' Mag	1984 1984 1985	 2.7585 2.8016	
Bradette Noseworthy	32E/05	Noranda Exploration Co. Ltd."Bradette 1-82"	Au,BM	Assess	DD (1) 503'	1984		
Bragg Newman	42H/08	Indo Canadian Res. Ltd.	Au,BM	Assess	AMag AEM-VLF	1985	2.8264	
Bragg Newman	42H/08	Wencarro Res. Ltd.	Au,BM	Assess	AMag AEM-VLF	1985	2.8264	
Browning Ogilvie	41P/06	Utah Mines Ltd. "Shiningtree Prop."	Au	Assess	Gc AEM-VLF AMag	1984 1985	2.7275 2.8371	
Bryce	41P/09	Briscoe, E.A.	Au	Assess	rTr	1962		
Bryce	41P/09	Morris, J.	Au	Assess	Mag VLF-EM	1985	2.8294	
Bryce	41P/09	Nielsen, J.	Au	Assess	STr rTr STr rTr	1961 1962		
Bryce	31M/09 41P/09	Yvanex Devel. Ltd. & Windjammer Power & Gas Ltd."Briscoe-Bryce Property"	Au	Assess	GL Gc Mag EM IP STr	1984 1985 1985	2.7340 2.7340	
Burt Holmes, Eby	42A/01 42A/02	Billiton Canada Ltd.	Au	Assess	AEM AMag AMag Grad	1984 1985	2.7381 2.8046	
Cabot	41P/11	Dea, A.	Au	Assess	STr	1985		
Cairo	41P/15	Asarco Exploration of Canada Ltd.	Au	Assess	STr	1985		
Cairo	41P/15	Comstate Res. Inc. "Montreal River Prop."	Au	Assess	DD (2) 793'	1984		
Cairo	41P/15	Comstate Res. Inc. "Moyneur Lake Prop."	Au	Assess	DD (1) 203'	1984		
Cairo	41P/15	Newmont Exploration of Canada Ltd. "Welsh-Sheedy Project"	Au	Assess	STr rTr	1981		

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Cairo	41P/15	Sunialoe, G.	Au	Assess	STr	1962		
Carr	42A/09 42A/10	Asarco Expl. Co. of Canada Ltd.	Au	Assess	DD (1) 662' OVD (3) 341'	1984 1984	2.7217	
Carr	42A/10	Canamax Resources Inc. "Carr 3"	Au	Assess	GL	1985	2.7924	
Carr	42A/09	Canamax Resources Inc. "Carr 4"	Au	Assess	GL	1985	2.7925	
Carr	42A/09	Canamax Resources Inc. "Carr 7"	Au	Assess	GL GL	1984 1985	2.7923 2.7921	
Carr	42A/09 42A/10	Canamax Resources Inc. "Carr 8"	Au	Assess	DD (1) 419' GL	1984 1985	2.7886	
Carr Wilkie	42A/09 42A/10	Canamax Resources Inc. "Pipestone Project"	Au	Assess	GL	1985	2.7928	
Carr	42A/09	Maude Lake Gold Mines Ltd."Carr Claim Group"	Au	Assess	Mag VLF-EM GL Rad GL Mag Rad VLF-EM	1984 1985	2.7091 2.7786	
Carr Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Wilkie-Carr Group"	Au	Assess	GL Rad VLF-EM Mag	1984	2.7643	
Carr	42A/10	Shogrin Minerals Inc. "Grid N-6,7,8,9"	Au	OMEP	VLF-EM Mag	1983	63.4226	
Case	32E/04	Morgan Minerals Inc.	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Casey	31M/12	Seal River Expl. "Casey Mountain Prop."	Au	Assess D	Mag VLF-EM DD (3) 1,631' CS	1984 1985 1985	2.7939	
Catharine Skead	31M/13	Cominco Ltd. "Cathroy Perron Prop."	Au	Assess	OVD (29) 2,093'	1985	2.8239	
Catharine	31M/13	Cook, B.G.	Au	Assess	SA	1985	2.7945	
Catharine	31M/13	Moncrieff Uranium Mines Ltd.	Au	D	SA	1985		
Catharine	31M/13	Perron, A.H. "Benson West Grid"	Au	Assess	Mag GL	1984	2.7265	
Catharine	31M/13 32D/04	Perron, A.H. "Catharine Six Group"	SEE	UNDER	BOSTON TOWNSHIP			
Catharine	31M/13	Perron, A.H. "Catharine Ten Group"	Au	Assess	GL	1985	2.8078	
Catharine Skead	31M/13	Perron, A.H. "Catharine 51"	Au	Assess	GL	1984	2.7584	
Catharine	31M/13	Perron, A.H. "Indian Six Group"	Au	Assess	STr	1985		
Catharine	31M/13	Perron, A.H. "Misema Eight Group"	Au	Assess	GL STr	1984 1985	2.7379	
Catharine McElroy	31M/13 32D/04	Shenandoah Res. Ltd.	Au	Assess	STr	1985		
Catharine	31M/13	Teck Expl. Ltd. "Block 11"	Au	Assess	VLF-EM	1985	2.7754	
Catharine	31M/13	Teck Expl. Ltd. "Block 111"	Au	Assess	VLF-EM	1985	2.7753	
Chamberlain	31M/13	Kapuskasing Res. Inc.	Au	Assess	DD (1) 400'	1985		
Churchill	41P/11	Cashaback, A.	Au	Assess	rTr	1985		
Churchill Kelvin	41P/11	Gail Resources Inc.	Au	Assess	AEM AMag	1985	2.7757	
Churchill	41P/11	Kidd Creek Mines Ltd.	Au	Assess	DD (1) 400'	1985		
Churchill Kelvin	41P/11	Marshall Minerals Corp.	Au	Assess	AMag AEM	1985	2.7758	
Churchill	41P/11	Onitap Resources Inc. "Jonson Lake Property"	Au	Assess	GL Gc	1984	2.7507	
Churchill	41P/11	Patino Mines Ltd. "Shiningtree 1 Property"	SEE	UNDER	ASQUITH TOWNSHIP			
Cleaver	42A/02	Melrose Resources Ltd. "Cleaver I Project"	Au	Assess	Mag VLF-EM	1984	2.7181	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Cleaver	42A/02	Melrose Resources Ltd. "Cleaver II Project"	Au	Assess	VLF-EM Mag	1984	2.7388	
Clifford	32D/05	Beswick, R.E.	Au	Assess	GL AMag AEM	1984 1985	2.7655 2.7982	
Clifford	32D/05	Croxall, J.; Allsopp, R.	Au	Assess	Mag SA STr	1984 1984 1984	2.7421 2.7435	
Clifford	32D/05	Herrick, V.	Au	Assess	STr rTr	1962		
Clifford	32D/05	Lac Minerals Ltd. "Grid C14"	Au	Assess	Mag	1985	2.8320	
Clifford	32D/05	Link, T.A.; Merrick, A.	Au	Assess	DD (1) 480'	1984		
Clifford	32D/05	St. Joe Canada Inc.	Au	Assess	OVD (10) 137'	1985	2.7989	
Connaught	41P/11	Patino Mines Ltd.	Au	Assess	CS	1984		
Cook	42A/08	Bennett, R.A.	Au	Assess	Mag Mag	1985 1985	2.8261 2.8609	
Cook	42A/08	Noranda Exploration Co. Ltd."Playfair Group"	SEE	UNDER	BENOIT TOWNSHIP			
Cook	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Coulson	42A/09	Campsall, L.	Au	Assess	STr	1985		
Coulson	42A/09	Canamax Res. Inc.	Au	Assess	DD (4) 1,198'	1984		
Coulson Knox	42A/09	Comstate Res. Ltd. "Shallow River Claims"	Au	Assess	GL	1985	2.8115	
Coulson	42A/09	Dalhousie Oil Corp.	SEE	UNDER	BEATTY TOWNSHIP			
Coulson	42A/09	Kennedy, W.A.	Au	Assess	rTr	1984		
Coulson Wilkie	42A/09	Kidd Creek Mines Ltd. "Wilkie 26"	Au	Assess	GL	1985	2.8555	
Coulson	42A/09	Maude Lake Gold Mines Ltd. "Coulson Group"	Au	Assess	VLF-EM Mag Rad	1984	2.8099	
Currie	42A/07	Asarco Expl. Co. of Canada Ltd. "Cook Project"	Au	Assess	Mag	1985	2.7676	
Currie	42A/08	Asarco Expl. Co. of Canada Ltd. "Vimy Ridge Project"	SEE	UNDER	BOWMAN TOWNSHIP			
Currie	42A/07	Dore Exploration Inc.	Au	Assess	rTr VLF-EM Mag	1984 1984	 2.7199	
Currie	42A/07 42A/08	Kidd Creek Mines Ltd.	SEE	UNDER	BOWMAN TOWNSHIP			
Currie	42A/07	Shogrin Minerals Inc. "Grid M-10"	Au	OMEP	VLF-EM Mag	1983	63.4226	
Dack	31M/13	Mowat, A.	Au	Assess	GL	1984	2.7416	
Eby	42A/01 42A/02	Billiton Canada Ltd.	SEE	UNDER	BURT TOWNSHIP			
Eby	42A/11	Perron, A.H. "Dead Man Mine"	Au	Assess	GL	1985	2.8383	
Eby	42A/01	Perron, A.H. "Eby Four Group"	Au	Assess	GL	1985	2.8263	
Eby	42A/01	Perron, A.H. "Eby 66 Group"	Au	Assess	GL	1985	2.8458	
Eby Otto	42A/01	Reed, J.D.	Au	Assess	DD (10) 1,056' SA STr	1984 1984	 2.7576	
Eby	42A/01	Rivard, F.	Au	Assess	STr rTr	1984		
Edwards Mortimer	42A/15	Noranda Exploration Co. Ltd."Edwards 1-83"	Au	Assess	HLEM Mag	1984	2.7183	
Egan	42A/07	Shogrin Minerals Inc. "Grids M-14,16,43, 44,47,48"	Au	OMEP	Mag VLF-EM GL	1983	63.4226	
Elliott	32D/05	Hobbs, L.G.	Au	Assess	Mag	1984	2.7510	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Elliott Thackeray	32D/05	Perrex Resources Inc. "Pothole Group"	Au	Assess	GL	1985	2.8300	
Elliott Harker	32D/05	Perron, A.H. "Elliott-Harker Group 1"	Au	Assess	STr	1985		
Elliott Harker	32D/05	Perron, A.H. "Elliott North Group"	Au	Assess	GL Mag VLF-EM	1985 1985	2.7788 2.7822	
Elliott	32D/05	Perron, A.H. "Little Elliott"	Au	Assess	VLF-EM Mag	1985	2.8055	
English	42A/02	Marjel Resources Inc.	Au	Assess	rTr	1985		
Flavelle	41P/16 42A/01	Cunningham, L.J. "Beaverdam Group"	Au	Assess	GL	1985	2.7877	
Frechette	41P/03	Jedburgh Res. Ltd.	Au	Assess	Mag VLF-EM DD (25) 3,564'	1984 1985	2.7119	
Frecheville	32D/12	Asarco Exploration Co. of Canada Ltd.	Au	Assess	HLEM Mag	1985	2.7674	
Frecheville	32D/12	St. Joe Canada Inc. "Frecheville North Group"	Au	Assess	Mag VLF-EM GL	1985	2.7992	
Frecheville	32D/12	St. Joe Canada Inc. "Frecheville South Property"	Au	Assess	Mag	1985	2.8226	
Galna, Kerrs Knox, Moody	42A/09 42A/16	Utah Mines Ltd. "Jim's Lake Property"	Au	Assess	DD (3) 2,231' VLF-EM Mag DD (8) 5,651'	1984 1985 1985	2.7850	
Garibaldi	41P/06	Harlin Resources Ltd. "Opikinimika Lake Project"	SEE	UNDER	BEULAH TOWNSHIP			
Garrison	32D/05	Cream Silver Mines Ltd.	Au	Assess	AMag AEM-VLF	1985	2.8307	
Garrison	32D/05 32D/12	Falconbridge Nickel Mines Ltd."Canyon Claims"	Au	Assess	GL Gc SA	1982	2.7329	
Garrison Harker	32D/05	Grandad Resources Ltd. "Ghost River Property"	Au	Assess	GL Gc VLF-EM Mag	1984 1984	2.7607 2.7608	
Garrison Thackeray	32D/05	Kerr Addison Mines Ltd."Kerr-Garrison Property"	Au	Assess	GL Mag VLF-EM DD (1) 505'	1985 1985	2.7717	
Garrison	32D/05 42A/08	Noranda Exploration Co. Ltd."Barnet 1-79"	SEE	UNDER	BARNET TOWNSHIP			
Garrison	32D/05	Union Mining Corp.	Au	Assess	Mag VLF-EM	1984 1985	2.7272 2.8474	
Gauthier	32D/04	Beaverhouse Lake Gold Mines Ltd.	Au	Assess	STr rTr DD (1) 100'	1960 1965		
Gauthier	32D/04	Bodick, J.	Au	Assess	rTr STr rTr	1984 1985		
Gauthier	32D/04	Daigle Cooper Mines Ltd.	Au	D	GL	1950		
Gauthier	32D/04	Hoffman Exploration & Minerals Ltd. "Gauthier 'East' Project"	Au	Assess	OVD (25) 1,140'	1984	2.7591	
Gauthier	32D/04	Hoffman Exploration & Minerals Ltd. "Gauthier 'F' Proj."	Au	Assess	OVD (9) 840'	1984		
Gauthier	32D/04	Jackson, H.	Au	Assess	Mag	1983	2.5451	
Gauthier	32D/04	Lac Minerals Ltd. "Gauthier Project"	Au	Assess	OVD (61) 2,007'	1985	2.8570	
Gauthier	32D/04 32D/05	Lac Minerals Ltd. "Grid A47"	SEE	UNDER	ARNOLD TOWNSHIP			
Gauthier	32D/05	Leahy, M.	Au	Assess	DD (1) 181'	1985		
Gauthier	32D/04	MacGregor, R.A.	Au	Assess	Mag Mag VLF-EM GL	1984 1984	2.7352 2.7143	
Gauthier	32D/04	Perron, A.H. "Northland Grid"	Au	Assess	Mag	1984	2.6921	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Gauthier	32D/04	Southwind Resources Exploration Ltd.	Au	Assess	IP	1985	2.8145	
Gauthier	32D/04	Taylor, T.C.	Au	Assess	DD (2) 251'	1966		
Grenfell	42A/01	Glen Auden Res. Ltd."Grenfell Prop."	SEE	UNDER	BOMPAS TOWNSHIP			
Grenfell	42A/01	Gorzalczynski, J.	Au	Assess	VLF-EM Mag SA	1985	2.7819	
Grenfell	42A/01	Perron, A.H. "One Man Mine Claim"	Au	Assess	STr Mag VLF-EM GL	1984 1985 1985	 2.8237 2.8374	
Grenfell	42A/01	Perron, A.H. "Perron-Grenfell Grid"	Au	Assess	GL	1984	2.6989	
Grenfell	42A/01	Perron, A.H. "Stitt Claims"	Au	Assess	GL VLF-EM Mag	1984 1985	2.7428 2.8166	
Grenfell	42A/01	Stitt, J.H.	Au	D	SA	1915		
Guibord	42A/08	Armco Minerals Expl. Ltd."Main Prop. Group"	Au	Assess	DD (1) 695'	1985		
Guibord	42A/08	Asarco Exploration Co. of Canada Ltd. "Holtyre East Prop."	Au	Assess	DD (1) 785' OVD (5) 619'	1985 1985	 2.8097	
Guibord Michaud	42A/08	Falconbridge Ltd. "Garrison Creek Proj."	Au	Assess	IP Mag IP Gc	1985 1985	2.8293 2.8128	
Guibord	42A/08 42A/09	Jascan Resources Ltd.	Au	Assess	DD (2) 930'	1985		
Guibord	42A/08	Kerr Addison Mines Ltd.	Au	Assess	OVD (71) 6,934'	1985	2.8203	
Guibord	42A/09 42A/08	Labrador Mining & Expl. Ltd."Munro Project"	Au	Assess	HLEM	1985	2.8148	
Guibord	42A/09	Lacana Mining Corp.	Au	Assess	HLEM Mag	1985	2.8176	
Guibord	42A/08	Parsons, G.E.	Au	Assess	SA STr	1984 1984	2.7582	
Guibord	42A/08 42A/09	Perron, A.H. "Greer Group"	Au	Assess	GL	1985	2.8079	
Guibord	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Halliday Hutt, Montrose	41P/14	Kidd Creek Mines Ltd.	Au	Assess	AEM AMag Mag VLF-EM	1984 1984	2.7570 2.8540	
Halliday, Midlothian, Sothman	41P/14 41P/15	Sylvanite Gold Mines Ltd.	Au	D	GL	1944		
Harker	32D/05	Barrick Res. Corp. "Lenora Property"	Au	Assess	DD (1) 839'	1985		
Harker	32D/12	Camflo Mines Ltd. "Lenora Property"	Au	Assess	DD (4) 2,503'	1984		
Harker Holloway	32D/05	Golden Harker Expl. Ltd. "Discovery-Lenora Joint Venture" 'East Group'	Au	Assess	Mag STr	1984	2.7361	
Harker	32D/05	Golden Harker Expl. Ltd."Discovery-Lenora Joint Venture" 'North Group'	Au	Assess	Mag	1984	2.7475	
Harker	32D/05	Grandad Resources Ltd. "Ghost River Property"	SEE	UNDER	GARRISON TOWNSHIP			
Harker	32D/05	Harley, N. "Harley 2 Claims"	Au	Assess	Mag Rad	1985	2.8535	
Harker	32D/05	Hurd, D.F.	Au	Assess	STr	1984		
Harker	32D/05 32D/12	Jonpol Exploration Co. Ltd.	Au	Assess	GL VLF-EM Mag	1984 1985	2.7307 2.7973	
Harker	32D/05 32D/15	Kerr Addison Mines Ltd."Neal Property"	Au	Assess	GL VLF-EM OVD (35) 2,495' DD (2) 941' SA	1985 1985 1985	2.7876 2.7876	
Harker	32D/12	Kerr Addison Mines Ltd."Sims Property"	Au	Assess	VLF-EM Mag GL DD (7) 3,312' SA	1984 1985	2.7232	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Harker	32D/05	Newmont Expl. of of Canada "Harker Lake Claims"	Au	Assess	Mag	1985	2.8210	
Harker	32D/05	Perrex Resources Inc. "Airborne Group"	Au	Assess	VLF-EM Mag	1985	2.7932	
Harker	32D/05	Perrex Resources Inc. "Duncan Claim Group"	Au	Assess	GL	1985	2.7865	
Harker	32D/05	Perrex Resources Inc. "Harker Lake Grid"	Au	Assess	Mag OVD (32) 1,160'	1984 1984	2.7008 2.7952	
Harker	32D/05	Perron, A.H. "Elliott North Group"	SEE	UNDER	ELLIOTT TOWNSHIP			
Harker	32D/05	Perron, A.H. "Elliott-Harker Group 1"	SEE	UNDER	ELLIOTT TOWNSHIP			
Harker	32D/05	Perron, A.H. "Iris 2 North"	Au	Assess	GL	1985	2.8563	
Hearst	32D/04	Falconbridge Copper Corp."Estrangement Lake Ext."	Au BM	Assess	VLF-EM Mag Grad IP	1984 1984	2.7551 2.7824	
Hearst	32D/04	Falconbridge Copper Corp."Larder Lake Project"	Au BM	Assess	DD (7) 3,954'	1984		
Hearst McElroy	32D/04	Hurd, D.	Au	Assess	rTr STr	1966		
Hearst	32D/04	Knutson Mining Corp.	Au	Assess	DD (3) 320'	1961		
Hearst	32D/04	Lac Minerals Ltd.	Au	Assess	DD (1) 597'	1983		
Hearst	32D/04	MacGregor, R.A. "Southwest Arm"	Au	Assess	VLF-EM Mag	1985	2.7999	
Hearst	32D/04	Rivard, F.	Au	Assess	DD (2) 168'	1985		
Hincks	41P/15 42A/02	Canamax Resources Inc. "Montrose 1"	SEE	UNDER	ARGYLE TOWNSHIP			
Hincks	42A/02	Johns-Manville Canada Inc. "McGill Group"	SEE	UNDER	ARGYLE TOWNSHIP			
Hincks	42A/02	Kiernicki, F.	Au	Assess	VLF-EM	1985	2.7652	
Hincks	42A/02	Marjel Resources Inc.	Au	Assess	GL	1985	2.8039	
Hincks	41P/15 42A/02	Petromet Res. Ltd. "Ashley Property"	SEE	UNDER	ARGYLE TOWNSHIP			
Hislop	42A/08 42A/09	Canamax Resources Inc. "Hislop 1"	Au	Assess	GL	1985	2.7927	
Hislop	42A/08	Neal, H.E.	Au	Assess	GL	1984	2.7443	
Hislop McCann, Playfair	42A/08	Playfair Resource Inc.	Au	Assess	AEM-VLF AMag	1985	2.8348	
Hislop	42A/08	Tittley, H.Z.	Au	Assess	Mag	1985	2.8056	
Hoblitzell Noseworthy	32E/05 32E/12	Ameritex Res. Ltd.	Au	Assess	AMag AEM	1984	2.7792	
Hoblitzell Noseworthy	32E/05 32E/12	Golden Shield Res.	Au	Assess	AMag AEM	1984	2.7378	
Hodgetts	41P/03 41P/06	Field Resources Ltd.	SEE	UNDER	BEULAH TOWNSHIP			
Hodgetts	41P/03	Goldmac Exp. Ltd.	Au	Assess	GL Gc	1984	2.7373	
Hodgetts	41P/03 41P/06	Ranex Minerals Inc.	Au	Assess	SA OVD (16) 222'	1984 1985	 2.8415	
Holloway	32D/05 32D/12	Argentex Res. Expl. Corp. "Inco Option"	Au	Assess	DD (11) 4,337' SA VLF-EM Mag GL OVD (25) 2,041'	1984 1985 1984	 2.7793 2.7793	
Holloway	32D/05 32D/12	Barrick Res. Corp.	Au	Assess	DD (1) 657'	1984		
Holloway Marriott	32D/05 32D/12	Boulder Mountain Res.	Au	Assess	AEM-VLF AMag	1985	2.8216	
Holloway	32D/05	Canadian Nickel Co. Ltd."Discovery-Lenora Joint Venture"	Au	Assess	STr DD (4) 1,762'	1984		

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Holloway	32D/05 32D/12	Canadian Nickel Co. Ltd. "East Group"	Au	Assess	DD (10) 4,337'	1984		
Holloway	32D/12	Canamax Resources Inc. "Holloway-2"	Au	Assess	DD (6) 4,441'	1985		
Holloway Tannahill	32D/05	Condaka Metals Corp. "Magusi River Prop."	Au	Assess	AMag AEM	1985	2.8302	
Holloway	32D/05	Golden Harker Expl. Ltd."Discovery-Lenora Joint Venture" 'East Group'	SEE	UNDER	HARKER TOWNSHIP			
Holloway Tannahill	32D/05	Newmont Expl. of Canada Ltd. "Holloway Project"	Au	Assess	Mag	1985	2.8312	
Holmes	42A/01 42A/02	Billiton Canada Ltd.	SEE	UNDER	BURT TOWNSHIP			
Holmes	42A/02	Dea, A. & Dea, I.J.	Au	Assess	Gc GL	1984	2.7363	
					STr rTr	1985		
Hutt	41P/14	Kidd Creek Mines Ltd.	SEE	UNDER	HALLIDAY TOWNSHIP			
Ingram	31M/13	Agnico-Eagle Mines Ltd.	Au	Assess	Mag	1985	2.7736	
Ingram	31M/13	Marshall, F.J.	Au	Asess	STr	1960		
Katrine, McVittie	32D/04	Kerr Addison Mines Ltd. "Katrine-McVittie Project"	Au	Assess	GL Mag VLF-EM	1985	2.8077	
Katrine	32D/04 32D/05	Kiazyk. B.	Au	Assess	SA	1982	2.7282	
					SA	1984	2.7590	
					DD (3) 317' rTr	1984		
					STr rTr	1985		
					DD (4) 435'	1985		
Katrine	32D/04 32D/05	Lac Minerals Ltd. "Grid A47"	SEE	UNDER	ARNOLD TOWNSHIP			
Katrine Ossian	32D/04	Rock Ore Exploration & Development Ltd.	Au	Assess	GL Gc SA VLF-EM	1984	2.7330	
					Gc SA	1984	2.7629	
Katrine	32D/04	Swansea Gold Mines Inc.	Au	Assess	DD (2) 817'	1985		
Kelvin	41P/11	Gail Resources Inc.	SEE	UNDER	CHURCHILL TOWNSHIP			
Kelvin	41P/11	Marshall Minerals Corp.	SEE	UNDER	CHURCHILL TOWNSHIP			
Kenning	32E/04	Morgan Minerals Inc.	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Kerrs	42A/09 42A/16	Noranda Exploration Co. Ltd."Kerrs 1-77"	Au	Assess	OVD (9) 1,423'	1985	2.7666	
Kerrs	42A/09 42A/16	Utah Mines Ltd. "Jim's Lake Property"	SEE	UNDER	GALNA TOWNSHIP			
Knight	41P/11	Decker, A.	Au	Assess	STr	1984		
Knight, MacMurchy Natal, Tyrrell	41P/11	Sutherland, W.D. "Arthur Lake Mines Ltd."	Au	Assess	STr	1965		
Knox	42A/09	Comstate Res. Ltd. "Shallow River Claims"	SEE	UNDER	COULSON TOWNSHIP			
Knox	42A/09 42A/16	Utah Mines Ltd. "Jim's Lake Property"	SEE	UNDER	GALNA TOWNSHIP			
Lebel Morrisette	32D/04	Chorsepa, E.	Au	D	GL rTr	1984		
				D	GL	1985		
Lebel	32D/04	Conisil Mines Ltd. "Bousan Gold Prospect"	Au	Assess	RS	1984	2.7556	
Lebel	32D/04	Kiernicki, F. "Gull Lake Property"	Au	Assess	Mag VLF-EM	1985	2.8309	
Lebel	32D/04	Labrador Mining & Exploration Co. Ltd.	Au	OMEP	DD (9) 5,234'	1982		
Lebel	32D/04	Lampe Resources Inc.	Au	Assess	STr DD (2) 303'	1984		
					CS	1984		
					Rad GL	1984	2.7581	
					SA	1985	2.7581	
					Rad	1984	2.7890	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Lebel	32D/04	Leahy, M. "Heart Lake Property"	Au	Assess	Mag VLF-EM	1984 1985	2.7580 2.8167	
Lebel	32D/04	Nova Beaucage Mines Ltd.	Au	Assess	VLF-EM Mag	1984	2.7534	
Lebel	32D/04	Peterson, E.	Au	Assess	rTr	1964		
Lee	42A/01	Glen Auden Res. Ltd. "Grenfell Property"	SEE	UNDER	BOMPAS TOWNSHIP			
MacMurchy	41P/11	Sutherland, W.D. "Arthur Lake Mines Ltd."	SEE	UNDER	KNIGHT TOWNSHIP			
Maisonville	42A/01	Cedar Ridge Expl. Ltd.	SEE	UNDER	BERNHARDT TOWNSHIP			
Maisonville	42A/01	Glen Auden Res. Ltd. "Grenfell Township.	SEE	UNDER	BOMPAS TOWNSHIP			
Maisonville	42A/01	Golden Summit Mines Ltd.	Au	D	GL Res	1944		
Maisonville	42A/02	Hahn, J.	Au	Assess	rTr	1985		
Maisonville	42A/01	Kruzynski,A.	Au	Assess	DD (1) 102'	1984		
Maisonville	42A/01	Leahy, M. & Queenston Gold Mines Ltd. "Mag Project"	Au	Assess	Mag VLF-EM	1985	2.7996	
Maisonville	42A/01	Noranda Exploration Co. Ltd."Maisonville 1-82"	Au	Assess	GL VLF-EM Mag	1984 1985	2.7780 2.8012	
Maisonville	42A/08 42A/01	Noranda Expl. Co. Ltd. "Wolf Lake Group"	SEE	UNDER	BENOIT TOWNSHIP			
Maisonville	42A/01	Pain, S.A.	Au	Assess	STr	1958		
Maisonville	42A/01	Premier Expl. Inc. "Blue Mountain Prop."	SEE	UNDER	BERNHARDT TOWNSHIP			
Marathon	42A/16	Noranda Expl. Co. Ltd. "Bowyer 1-82 & Marathon 1-82"	Au	Assess	DD (2) 1,796'	1984		
Marriott	32D/05 32D/12	Boulder Mountain Resources Ltd.	SEE	UNDER	HOLLOWAY TOWNSHIP			
Marriott	32D/05 32D/12	Neal, H.E. "Marriott Claims"	Au	Assess	GL	1984	2.7651	
Marriott	32D/05	St. Joe Canada Inc.	Au	Assess	Mag	1985	2.8109	
Marshay	41P/03	Ranex Minerals Inc.	Au	Assess	STr SA	1985 1985		
Marter	31M/13	Aubin, A.	Au	Assess	STr	1965		
McCann	42A/08	Hyde, D.	Au	Assess	STr rTr	1985		
McCann	42A/08	Playfair Res. Inc.	SEE	UNDER	HISLOP TOWNSHIP			
McCool	42A/09	Fournier, E.	Au	Assess	DD (1) 175' STr	1984		
McCool	42A/09	Kapuskasing Res. Ltd.	Au	Assess	VLF-EM Mag GL Rad	1984	2.7548	
McCool	42A/08 42A/09	Labrador Mining & Expl. Ltd. "Munro Project"	SEE	UNDER	GUIBORD TOWNSHIP			
McCool	42A/09	Placer Development Ltd."Belore Option"	Au	Assess	DD (5) 2,422'	1984		
McElroy	31M/13 32D/04	Bishop, J.	SEE	UNDER	BOSTON TOWNSHIP			
McElroy	32D/04	Boylen, M.J.	Au	Assess	STr	1967		
McElroy	32D/04	Hill, R.	Au	Assess	STr	1984		
McElroy	32D/04	Hurd, D.	SEE	UNDER	HEARST TOWNSHIP			
McElroy	32D/04	Kapuskasing Res. Ltd.	Au	Assess	GL Mag VLF-EM Rad	1984	2.7549	
McElroy	32D/04	Lowe, D.	Au	Assess	DD (2) 338' STr rTr	1962 1963		
McElroy	32D/04	MacGregor, R.A. "McElroy West Group"	Au	Assess	STr STr SA	1981 1985 1985	 2.8559	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
McElroy	32D/04	MacGregor, R.A. "Moly Hill Property"	Au Mo	Assess	DD (1) 133'	1984		
					VLF-EM	1984	2.7484	
					SA	1984	2.7920	
					SA	1984	2.7978	
McElroy	32D/04	McElroy Sydicate "Molybdenum Prospect"	Au	Assess	STr	1966		
McElroy	31M/13 32D/04	Perron, A.H. "Catharine Six Group"	SEE	UNDER	BOSTON TOWNSHIP			
McElroy	31M/13 32D/04	Shenandoah Res. Ltd.	SEE	UNDER	CATHARINE TOWNSHIP			
McElroy	32D/04	Yost, C.A. & R.	Au	Assess	STr rTr	1985		
McGarry	32D/04	Boudreault. B.; Spadetto, G.	Au	Assess	STr rTr	1984		
					Mag	1984	2.7321	
					STr	1985		
McGarry McVittie	32D/04	Edomar Resources Inc.	Au	Assess	DD (1) 401'	1984		
					GL	1984	2.7337	
					DD (6) 2,019'	1985		
					GL	1985	2.8306	
McGarry	32D/04	Kerr Addison Mines Ltd. "579322"	Au	Assess	DD (1) 100'	1985		
McGarry	32D/04	Kerr Addison Mines Ltd. "Leahy-McGarry Project 0-44"	Au	Assess	DD (1) 1,533'	1985		
McGarry	32D/04	Leahy, M. "Border Group"	Au	Assess	GL	1984	2.7644	
McGarry	32D/04	Leahy, M. "Boudreault Claims"	Au	Assess	Mag	1985	2.8274	
McGarry	32D/04	Leahy, M. "Claim 802567"	Au	Assess	Mag	1985	2.8547	
McGarry	32D/04	Leahy, M. "McGarry Property West"	Au	Assess	DD (3) 479'	1985		
McGarry	32D/04	MacGregor, R.A. "MacGregor South Group"	Au	Assess	Mag VLF-EM	1985	2.8083	
McGarry	32D/04	McGarry Resources Inc.	Au	Assess	DD (5) 2,728'	1985		
McGarry	32D/04	Tresdor Larder Mines Ltd.	Au	D	GL SA	1949		
McNeil	42A/02	Argyle Ventures Inc. "McNeil Property"	Au	Assess	SA STr rTr	1984		
					GL SA	1984	2.8048	
McNeil	42A/02	Manville Canada Inc. "Bobjo Group"	Au	Assess	STr rTr	1984		
					DD (3) 370'	1984		
McVittie	32D/04	Dobrijevich, I.	Au	Assess	STr rTr	1966		
McVittie	32D/04	Edomar Resources Inc.	SEE	UNDER	MCGARRY TOWNSHIP			
McVittie	32D/04	Joy, W.C.	Au	Assess	STr	1961		
McVittie	32D/04	Kerr Addison Mines Ltd. "Katrine- McVittie Project"	SEE	UNDER	KATRINE TOWNSHIP			
McVittie	32D/04	Lacasse, L.	Au	Assess	DD (1) 112'	1985		
McVittie	32D/04	Lac Minerals Ltd.	Au	Assess	AMag AEM ARad	1984	2.7215	
McVittie	32D/04 32D/05	Lac Minerals Ltd. "Grid A47"	SEE	UNDER	ARNOLD TOWNSHIP			
McVittie	32D/04	Leahy, M. "Pearl Beach Property"	Au	Assess	VLF-EM	1985	2.8142	
McVittie	32D/04	Lenora Expl. Ltd.	Au	OMEP	SA DD (10) 1,234'	1982		
McVittie	32D/04	MacGregor, R.A. "Fork Lake Group" & "Diamond Lake Group"	Au	Assess	DD (1) 104'	1984		
					SA	1984	2.7917	
					SA	1985	2.7979	
					Mag VLF-EM	1984	2.7998	
McVittie	32D/04	MacGregor, R.A. "Group 2 East"	Au	Assess	DD (2) 3,314'	1984		
					SA	1985	2.7980	
McVittie	32D/04	Smith, L.	Au	Assess	STr rTr	1960		
Melba	42A/08	Boone, P.F.; Laurila, J.P.	Au	Assess	STr	1984		

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Melba	32D/05 42A/08	Falconbridge Copper Corp. "Rosario Option"	SEE	UNDER	BISLEY TOWNSHIP			
Melba	42A/08	Hurd, D.F.	Au	Assess	rTr rTr STr	1984 1985 1960		
Melba	42A/08	Kittilson,E.; Hurd, D.	Au	D	STr	1960		
Melba	42A/01 42A/08	Noranda Expl. Co. Ltd. "Wolf Lake Group"	SEE	UNDER	BENOIT TOWNSHIP			
Melba	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Michaud	42A/09	Asarco Exploration Co. of Canada Ltd. "Perry Lake Claim Grp"	Au	Assess	DD (1) 492'	1984		
Michaud	42A/08	Falconbridge Ltd. "Garrison Creek Proj."	SEE	UNDER	GUIBORD TOWNSHIP			
Michaud	42A/09	Falconbridge Ltd. "Thibault Claims"	Au	Assess	IP Mag DD (3) 1,580'	1984 1985	2.7750	
Michaud	42A/08	Falconbridge Nickel Mines Ltd.	Au	Assess	IP GL	1985	2.7769	
Michaud	42A/08	Gold Fields Canadian Mining Ltd.	Au	Assess	OVD (24) 2,412'	1984	2.7550	
Michaud	42A/08 42A/09	Labrador Mining & Expl. Ltd. "Munro Project"	SEE	UNDER	GUIBORD TOWNSHIP			
Michaud	42A/08	Nahanni Mines Ltd. "October & September Grid"	Au	Assess	GL	1983	2.7593	
Michaud	32D/05 42A/08	Noranda Exploration Co. Ltd."Barnet 1-79"	SEE	UNDER	BARNET TOWNSHIP			
Michaud	42A/08	Noranda Expl. Co. Ltd. "Windjammer Option"	Au	Assess	DD (2) 1,934'	1985		
Michaud	42A/08	St. Joe Canada Inc.	SEE	UNDER	BARNET TOWNSHIP			
Mickle	41P/09	Silver Lake Res. Inc. "Cameron Silver-Cobalt Property"	Au	OMEP Assess	DD (43) 16,322' DD (3) 1,047'	1982 1985	63.4185	
Midlothian	41P/14 41P/15	Sylvanite Gold Mines Ltd.	SEE	UNDER	HALLIDAY TOWNSHIP			
Milligan Warden	42A/09	Bay Resources et Services Inc. "Crossley, J.D.; Geisler, C.M. claims"	Au	Assess	Gc	1985	2.8314	
Milligan Warden	42A/09	Foster, W.	Au	Assess	Gc	1984	2.8150	
Milligan Rayner Lake	42A/09	Ryan, W.J.	Au	Assess	DD (1) 602' STr rTr SA	1985 1985		
Milligan, Warden Rayner Lake	42A/09	Utex Gold "Grubstake 84"	Au	Assess	Gc	1984	2.8124	
Miramichi	41P/11	Onitap Resources Inc. "Ola Lake Property"	Au	Assess	DD (5) 466'	1985		
Mistaken Islands	32D/12	Noranda Expl. Co. Ltd. "Noranda Middle Group"	Au	Assess	VLF-EM Mag	1984	2.7601	
Mistaken Islands	32D/12	Noranda Expl. Co. Ltd. "Noranda North Group"	Au	Assess	VLF-EM, Mag OVD (13) 954'	1984 1985	2.7600 2.7960	
Mistaken Islands Stoughton	32D/12	Noranda Expl. Co. Ltd. "Stoughton 1-79"	Au	Assess	VLF-EM Mag OVD (9) 520' OVD (33) 2,367'	1984 1984 1985	2.7599 2.7193 2.7960	
Moffat	41P/06	Harlin Resources Ltd. "Opikinimika Lake Proj."	SEE	UNDER	BEULAH TOWNSHIP			
Montrose	41P/15 42A/02	Canamax Resources Inc. "Montrose 1"	SEE	UNDER	ARGYLE TOWNSHIP			
Montrose	41P/14	Hagen, J.D.	Au	Assess	STr	1985		
Montrose	41P/14	Kidd Creek Mines Ltd.	SEE	UNDER	HALLIDAY TOWNSHIP			

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Moody	42A/16	Noranda Expl. Co. Ltd. "Moody 1-81"	Au	Assess	DD (1) 412'	1984		
Moody	42A/09 42A/16	Utah Mines Ltd. "Jim's Lake Property"	SEE	UNDER	GALNA TOWNSHIP			
Morrisette	32D/04	Chorzepa, E.	SEE	UNDER	LEBEL TOWNSHIP			
Morrisette	32D/04	Edda Resources Inc.	Au	Assess	DD (1) 576' CS SA Mag VLF-EM	1984 1984 1985	2.8331	
Morrisette	32D/04	Gleeson-Rampton Expls. "Alfie Creek Claim Grp."	SEE	UNDER	ARNOLD TOWNSHIP			
Morrisette	32D/04	Gleeson-Rampton Expls. "Lahaie Lake Claim Grp."	Au	Assess	Gc	1984	2.5807	
Morrisette	32D/04	Gleeson-Rampton Expls. "Morrisette Creek Grp."	Au	Assess	Gc GL SA	1984 1985	2.7656 2.8102	
Morrisette	32D/04 32D/05	Lac Minerals Ltd. "Grid M17"	Au	Assess	Mag	1985	2.8327	
Morrisette	32D/04	Lac Minerals Ltd. "Grid M21"	Au	Assess	Mag	1985	2.8321	
Morrisette	32D/04	Lac Minerals Ltd. "Grid M40"	Au	Assess	VLF-EM Mag	1985	2.8322	
Morrisette	32D/04	Ward, J.T. "Blewett Mountain Grp."	Au	Assess	Gc SA	1985	2.7749	
Mortimer	42A/15	Noranda Expl. Co. Ltd. "Edwards 1-83"	SEE	UNDER	EDWARDS TOWNSHIP			
Mortimer	42A/15	St. Denis, R.	Au	Assess	rTr SA	1985 1984		
Munro	42A/08 42A/09	Labrador Mining & Expl. Ltd. "Munro Project"	SEE	UNDER	GUIBORD TOWNSHIP			
Munro	42A/09	Manville Canada Inc. "Deadman Hill Group"	Au	Assess	GL Rad VLF-EM Mag	1984	2.7654	
Munro	42A/09	Perch, P.	Au	Assess	STr	1964		
Munro	42A/09	Richmond, G.	Au	Assess	Gc	1983	2.6910	
Natal	41P/11	Sutherland, W.D. "Arthur Lake Mines Ltd."	SEE	UNDER	KNIGHT TOWNSHIP			
Newman	42H/08	Grandad Resources Inc. "Mikwam River Prop."	Au	Assess	HLEM Mag	1984	2.7706	
Newman Tomlinson	42H/08	Grandad Resources Inc.	Au	Assess	AEM AMag	1985	2.8422	
Newman	42H/08	Indo Canadian Res. Ltd.	SEE	UNDER	BRAGG TOWNSHIP			
Newman	42H/08	Wencarro Res. Ltd.	SEE	UNDER	BRAGG TOWNSHIP			
Nicol	41P/10	United Reef Petroleum Ltd.	Ag	D	DD (9) 3,240'	1968		
Noseworthy	32E/05 32E/12	Ameritex Res. Ltd.	SEE	UNDER	HOBLITZELL TOWNSHIP			
Noseworthy	32E/12	Golden Shield Res.	SEE	UNDER	HOBLITZELL TOWNSHIP			
Noseworthy	32E/05 32E/12	Loydex Resources Inc.	Au	Assess	AMag AEM	1984	2.7783	
Noseworthy	32E/12	Newmont Expl. of Canada Ltd.	SEE	UNDER	BRADETTE TOWNSHIP			
Noseworthy	32E/05 32E/12	Newmont Expl. of Canada Ltd. "Mikwam Property"	Au	Assess	OVD (28) 3,206'	1985	2.8347	
Noseworthy	32E/05	Noranda Expl. Co. Ltd. "Bradette 1-82"	SEE	UNDER	BRADETTE TOWNSHIP			
Ogilvie	41P/06	Utah Mines Ltd. "Shiningtree Property"	SEE	UNDER	BROWNING TOWNSHIP			
Ossian	32D/04	Firespur Expl. Ltd.	Au	Assess	STr Mag VLF-EM	1985 1985	2.8426	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Ossian	32D/04	Rock Ore Exploration & Development Ltd.	SEE	UNDER	KATRINE TOWNSHIP			
Otto	42A/01	Birnie, B.	Au	Assess	STr STr	1984 1985		
Otto	42A/01	Jomi Minerals & Expediting Ltd. "Group D"	Au	Assess	Gc	1984	2.6871	
Otto	42A/01	Reed, J.D.	SEE	UNDER	EBY TOWNSHIP			
Otto	42A/01	Vesich, Z.	Au	Assess	DD (3) 302'	1984		
Pacaud	31M/13	Boston Creek Mines Ltd.	Au	Assess	STr rTr	1985		
Pacaud	31M/13	Hurd, D.F.	Au	Assess	STr	1984		
Pacaud	31M/13	Perron, A.H. "Barry Hollinger Prop."	Au	Assess	Mag VLF-EM	1985	2.7964	
Pacaud	31M/13 32D/04	Perron, A.H. "Catharine Six Group"	SEE	UNDER	BOSTON TOWNSHIP			
Pacaud	31M/13 32D/04	Shiningtree Gold Res. Inc."Canico-Shiningtree Joint Venture"	SEE	UNDER	BOSTON TOWNSHIP			
Playfair	42A/08	Bodick, J.	Au	Assess	rTr rTr	1984 1985		
Playfair	42A/02	Marjel Resources Inc.	Au	Assess	VLF-EM	1985	2.8135	
Playfair	42A/08	Miller, W.H.	Au	D	GL	1947		
Playfair	42A/08	Noranda Expl. Co. Ltd. "Playfair Group"	SEE	UNDER	BENOIT TOWNSHIP			
Playfair	42A/08	Playfair Res. Inc.	SEE	UNDER	HISLOP TOWNSHIP			
Pontiac	32D/05	Roche, P.	Au	Assess	GL STr	1961		
Rayner Lake	42A/09	Ryan, W.J.	SEE	UNDER	MILLIGAN TOWNSHIP			
Rayner Lake	42A/09	Utex Gold "Grubstake 84"	SEE	UNDER	MILLIGAN TOWNSHIP			
Shillington	41P/15	Chicago-Gow Ganda Mines Co. Ltd.	Au	D	UG	1911		
Singer	32E/04	Morgan Minerals Inc.	SEE	UNDER	ABBOTSFORD TOWNSHIP			
Skead	31M/13	Cominco Ltd. "Cathroy Perron Prop."	SEE	UNDER	CATHARINE TOWNSHIP			
Skead	31M/13	Maple Mountain Res. Ltd. "La Pond Project"	Au	Assess	UG	1984		
Skead	31M/13	Perron, A.H. "Benson Creek Claims"	Au	Assess	GL	1984	2.7392	
Skead	31M/13	Perron, A.H. "Catharine 51"	SEE	UNDER	CATHARINE TOWNSHIP			
Sothman	41P/14 41P/15	Sylvanite Gold Mines Ltd.	SEE	UNDER	HALLIDAY TOWNSHIP			
Sothman	41P/14	Wrigley Syndicate	Au	D	Res SP	1947		
Stoughton	32D/12	Noranda Expl. Co. Ltd. "Stoughton 1-79"	SEE	UNDER	MISTAKEN ISLANDS			
Tannahill	32D/05	Condaka Metals Corp. "Magusi River Prop."	SEE	UNDER	HOLLOWAY TOWNSHIP			
Tannahill	32D/05	Mathias, A.	Au	Assess	STr	1984		
Tannahill	32D/05	Newmont Expl. of Canada Ltd. "Holloway Project"	SEE	UNDER	HOLLOWAY TOWNSHIP			
Taylor	42A/10	Canamax Resources Inc. "Pipestone Project-Taylor 3, 5"	Au	Assess	GL	1985	2.7804	
Taylor	42A/10	Canamax Resources Inc. "Stock 3"	Au	Assess	GL	1985	2.7767	
Taylor	42A/10	Canamax Resources Inc. "Taylor 1, 4"	Au	Assess	GL	1985	2.7803	

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Taylor	42A/10	Chisholm, E.O.	Au	Assess	DD (1) 97'	1984		
Teck	42A/01	Ansara, M.A.	SEE	UNDER	BERNHARDT TOWNSHIP			
Teck	42A/01	Duncan, J.	Au	Assess	GL Mag VLF-EM	1984 1985	2.7338 2.8562	
Teck	42A/01	Eden Roc Mineral Corp.	Au	OMEP	GL SA	1983	63.4206	
Teck	42A/01	Forbes, C.P.; Leahy, M. "Black Property"	Au	Assess	DD (1) 101'	1985		
Teck	42A/02	Hurd, D.F.	Au	Assess	DD (3) 323'	1961		
Teck	42A/01	Jomi Minerals & Expediting Ltd. "Dyment-Kidston Claims" 'Group A & B'	Au	Assess	GL SA Gc	1984 1984	2.6843 2.6878	
Teck	42A/01	Merrell, L.B.; Smith, O.G.	Au	Assess	DD (1) 121'	1961		
Teck	42A/01	Perron, A.H. "Groups 1 & 2"	Au	Assess	VLF-EM Mag	1984	2.7357	
Teck	42A/01	Perron, A.H. "Wedge Claims"	Au	Assess	VLF-EM	1985	2.8065	
Teck	42A/02	Queenston Gold Mines Ltd."Upper Kirkland Property"	Au	OMEP	GL SA	1983		
Thackeray	32D/05	Cominco Ltd.	Au	Assess	AMag AEM	1985	2.8282	
Thackeray	32D/05	Kerr Addison Mines Ltd. "Kerr-Garrison Property"	SEE	UNDER	GARRISON TOWNSHIP			
Thackeray	32D/05 42A/08	Noranda Expl. Co. Ltd. "Barnet 1-79"	SEE	UNDER	BARNET TOWNSHIP			
Thackeray	32D/05	Perrex Resources Inc. "Pothole Group"	SEE	UNDER	ELLIOTT TOWNSHIP			
Thackeray	32D/05 42A/08	Peter Island Res. Inc.	SEE	UNDER	BARNET TOWNSHIP			
Tomlinson	42H/08	Grandad Resources Ltd.	SEE	UNDER	NEWMAN TOWNSHIP			
Tyrrell	41P/11	Sutherland, W.D. "Arthur Lake Mines Ltd."	SEE	UNDER	KNIGHT TOWNSHIP			
Tyrrell	41P/10	Timiskaming Nickel Ltd.	Au	Assess	STr	1970		
Unwin	41P/06	Ranex Minerals Inc.	Au	Assess	OVD (15) 320'	1985	2.8421	
Walker	42A/10	Canamax Resources Inc. "Walker 3"	Au	Assess	GL	1985	2.7922	
Walker	42A/10	Canamax Resources Inc. "Walker 4, 6"	Au	Assess	GL GL	1985 1985	2.7840 2.7843	
Walker	42A/10	Cosby, M.S.	Au	Assess	Mag VLF-EM	1985	2.8432	
Walker Wilkie	42A/10	Kidd Creek Mines Ltd. "Wilkie 22"	Au,BM	Assess	HLEM VLF-EM Mag STr DD (1) 1,367' DD (6) 6,958'	1984 1984 1984 1985	2.7562	
Warden	42A/09	Bay Resources et Services Inc. "Crossley, J.D.; Geisler,C.M. claims"	SEE	UNDER	MILLIGAN TOWNSHIP			
Warden	42A/09	Foster, W.	SEE	UNDER	MILLIGAN TOWNSHIP			
Warden	42A/09	Utex Gold "Grubstake 84"	SEE	UNDER	MILLIGAN TOWNSHIP			
Wesley	42A/15	Noranda Expl. Co. Ltd. "Wesley 2-83"	Au	Assess	Mag HLEM DD (1) 710'	1984 1985	2.7185	
Wilkie	42A/09 42A/10	Canamax Resources Inc. "Pipestone Project"	SEE	UNDER	CARR TOWNSHIP			
Wilkie	42A/09	Fournier, E.	Au	Assess	DD (2) 370' STr	1984 1984		

TABLE 7.4 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Wilkie	42A/09	Kidd Creek Mines Ltd. "McChristie Option"	Au	Assess	DD (1) 1,036' STr Mag	1985 1985	 2.7659	
Wilkie	42A/10	Kidd Creek Mines Ltd. "Wilkie 22"	SEE	UNDER	WALKER TOWNSHIP			
Wilkie	42A/09	Kidd Creek Mines Ltd. "Wilkie 26"	SEE	UNDER	COULSON TOWNSHIP			
Wilkie	42A/10	Kidd Creek Mines Ltd. "Wilkie 31"	Au	Assess	Mag HL-EM VLF-EM	1985	2.8593	
Wilkie	42A/09	Maude Lake Gold Mines Ltd. "Wilkie-Carr Group"	SEE	UNDER	CARR TOWNSHIP			
Yarrow	41P/15	Barker Mining Synd.	Au	Assess	STr rTr	1962		

Geologists with the Precambrian Section of the Ontario Geological Survey continued to map the bedrock geology in part of the BRIM area during 1985 (Johnstone and Trowell 1985a). During 1985, the eastern half of McCool and the northern parts of Hislop, Guibord, and Michaud Townships were mapped. Preliminary results of this mapping were released late in 1985 (Johnstone and Trowell 1985b). Bedrock geology maps of the Ramore area (Jensen 1985a, 1985b, 1985c) were also published.

Geologists with the Mineral Deposits Section of the Ontario Geological Survey continued to study selected deposits located within the BRIM area. Activities during 1985 were focused on gold mineralization in the Holloway-Harker-Thackeray Township area (Whittaker 1985), on gold-silver-copper mineralization and associated alteration at the Ross Mine in Hislop Township (Troop 1985a, 1985b), and at the St. Andrew Goldfields (Stock Township) and Maude Lake (Beatty Township) gold deposits (Malczak 1985a, 1985c, 1985d). An Ontario Geological Survey Open File Report concerning the potential of the BRIM area to host industrial minerals is expected to be released during 1986 (cf. Malczak 1985b).

An inventory of the peat and peatland resources of the Timmins-Kirkland Lake area was released during 1985 (Northland Associates Limited 1985).

Compilation of Geological Data Inventory Folios (GDIFs) by K.D. Kalicharran and staff at the office of the Resident Geologist in Kirkland Lake is ongoing. During 1985, GDIFs for the townships of Bowman, Carr, Currie, Frecheville, Lamplugh, Marriott, Stoughton, and Taylor (GDIF Numbers 271, 265, 270, 268, 267, 273, 269, and 264, respectively) were released. Compilation for an additional 14 townships has been completed (Figure 7.4) and these are expected to be released in the near future. GDIF compilation for each township within the BRIM area is expected to be completed during 1987.

As of November 30, 1985, about 34 000 m of diamond drill core from 350 holes representing in excess of 51 000 m of diamond drilling in the BRIM area have been catalogued and shelved and are available for examination and sampling at the Larder Lake and Porcupine Mining Division Drill Core Storage Libraries (*see* Figure 7.2). Also available for examination are bedrock samples from the 1984 Ontario Geological Survey sonic overburden drilling program. Cataloguing of about 12 000 hand sample rock specimens is ongoing by the staff at the Larder Lake Mining Division Core Library collected from the eastern and south-central parts of the BRIM area by L. Jensen during the course of his bedrock geological mapping. When fully catalogued, details such as township location, NTS and UTM coordinates, rock type, lithology, geochemical and assay data (where applicable), and storage location for each sample will be stored in a computerized database to optimize accessibility and facilitate use of this data.

As part of Operation Black River-Matheson, an Economic Geologist is based in Kirkland Lake to encourage exploration activity at the local level by being available to all members of the exploration community as a source of exploration-related information and advice. Efforts of the Economic Geologist are directed toward the mining, exploration, and prospecting communities to promote activity in the BRIM area, to catalyze the property optioning process, to interface between the public and private sectors, and in general to provide services which facilitate exploration. Specifically, the economic geologist is available to: 1) assist local prospectors with property visits, advice, and assessment file searches; 2) document new mineral occurrences in the BRIM area; 3) more fully describe previously documented mineral occurrences; 4) compile data relevant to exploration; and 5) help "orient" new workers or potential new workers to the area. A long term goal of the program is the compilation of a locally accessible geoscience database for the BRIM area.

Activities of the Black River-Matheson area Economic Geologist during 1985 are described in Bath (1985a). In brief:

1. Most of the field season during 1985 was spent examining mineral showings in the field. Individual deposits examined during 1985 are shown on Figure 7.5 and are briefly described in Table 7.6.
2. A bedrock geological compilation map (scale 1:100 000) of the BRIM area has been generated from 57 provincial maps and reports which were

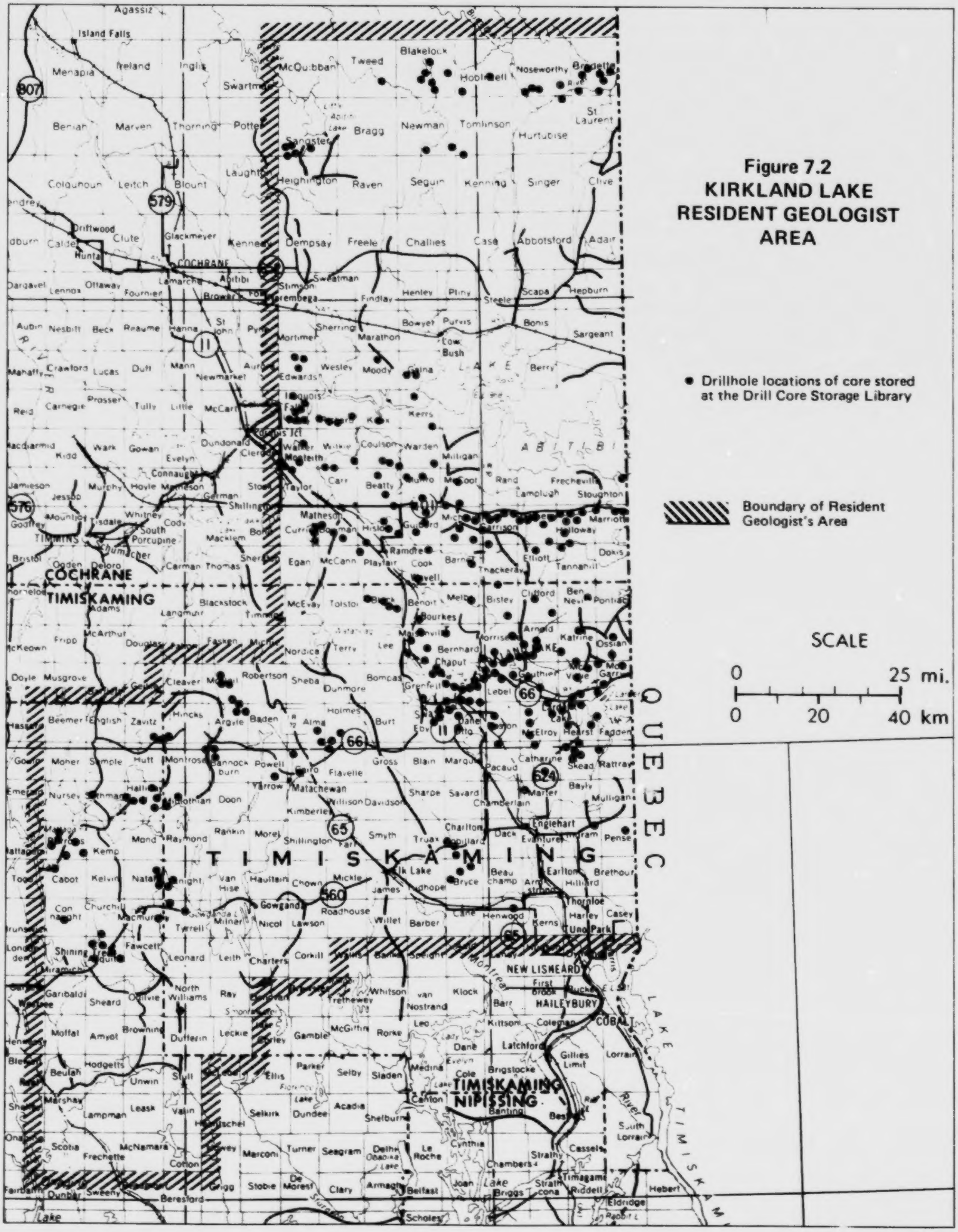


Figure 7.2
KIRKLAND LAKE RESIDENT GEOLOGIST AREA

● Drillhole locations of core stored at the Drill Core Storage Library
▨ Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km
COCHRANE
TIMISKAMING
TIMISKAMING
NIPISSING
QUEBEC
TIMMINS
NEW LISKEARD
HAILEYBURY
COBALT
Englehart
Matachewan
Gowganda
Elk Lake
Iroquois Falls
Matheson
South Porcupine
Island Falls
Lake Abitibi
Lake Timiskaming
11
65
66
101
560
579
624
634
576
807

TABLE 7.5 . CORE STORED AT KIRKLAND LAKE DRILL CORE LIBRARY

Township	Company	Drill Hole Length (m)	Core Stored (m)
Alma	Minorex Limited	326.5	295.0
Alma	Northclaim Resources	93.6	1.6
Argyle	Mid-North Engineer Ser. Ltd.	640.5	7.1
Argyle	New Kelore Mines Ltd.	320.1	4.0
Arnold	Merrick, A., Link, T.	1864.7	1695.7
Asquith	Annett, R.	73.2	61.0
Asquith	Patino Mines Limited	75.9	75.3
Asquith	Southgate Resources	180.6	2.5
Asquith	Timmins Gold Resources	979.7	854.9
Bannockburn	Hanna Mining Company	93.4	74.1
Bannockburn	MPH Consulting Ltd.	254.2	232.3
Bannockburn	Quevillon, G.	180.3	4.2
Barnet	Noranda Exploration Co. Ltd.	135.3	132.9
Beatty	Amax Minerals Exploration	145.9	141.8
Beatty	Gulf Minerals Canada Limited	1039.6	930.8
Beatty	Noranda Exploration Co. Ltd.	399.2	191.7
Ben Nevis	Beaudry, R.	408.4	261.5
Benoit	Goliath Mines Ltd.	645.6	627.6
Bernhardt	Beaumont Consolidated	871.7	129.7
Bisley	Monopros Ltd.	389.2	288.6
Black	Card Lake Copper Mines Ltd.	2196.3	1815.8
Black	Goliath Mines Ltd.	502.1	354.7
Black	McKinnon, D.	2164.9	1991.7
Blakelock	Noranda Exploration Co. Ltd.	401.5	293.7
Blakelock	Utah Mines Limited	269.7	157.2
Boston	Canadian Nickel Co. Ltd.	498.3	485.4
Boston	Dominion Foundaries	97.5	95.1
Boston	Kerr Addison Mines Limited	167.6	1.6
Bowman	Asarco Exploration Company	713.7	532.1
Bowman	Prospection Ltd.	118.3	116.4
Bradette	Newmont Exploration Canada Ltd.	2448.5	1741.3
Bradette	Noranda Exploration Co. Ltd.	533.9	320.2
Bryce	Anaconda Canada Exploration	913.8	877.0
Bryce	Bush, C.	232.5	229.8
Burrows	Hanna Mining Company	138.4	92.0
Burrows	Newmont Exploration Canada Ltd.	1614.9	1545.4
Cabot	Hanna Mining Company	212.4	131.1
Cairo	Minorex Limited	598.0	553.9
Casey	Pronto Exploration	232.0	205.1
Catharine	Amax Minerals Exploration	8228.4	7714.8
Catharine	Link, W.O.	302.7	263.7
Churchill	Patino Mines Limited	117.0	116.1
Churchill	Shiningtree Gold Res. Inc.	1005.3	966.3
Churchill	Timmins Gold Resources	100.3	75.9
Cleaver	Teck Exploration Limited	323.4	4.0
Clifford	Merrick, A., Link, T.	462.4	418.7
Clifford	Noranda Exploration Co. Ltd.	227.9	1.8
Connaught	Patino Mines Limited	515.4	488.4
Cook	New Kelore Mines Limited	172.6	81.6
Cook	Noranda Exploration Co. Ltd.	146.0	104.5
Coulson	Canamax Resources Inc.	207.0	166.3
Coulson	Labrador Exploration Ltd.	325.0	278.6
Currie	Asarco Exploration Company	3971.2	2898.2
Currie	Turney, W.J.	39.0	0.2
Eby	Harrington, P.	67.1	0.6
Eby	Noranda Exploration Co. Ltd.	45.1	39.6

TABLE 7.5 **Continued**

Eby	Reed, J.D.	360.0	342.4
Edwafds	Amax Minerals Exploration	321.3	231.3
Edwards	Canamax Resources Incorporated	510.0	243.1
Elliott	Lenora Explorations Ltd.	270.0	267.3
Flavelle	Minorex Limited	91.4	75.3
Galna	Utah Mines Ltd.	662.0	577.3
Garrison	Amax Minerals Exploration	790.0	624.7
Garrison	Canamax Resources Inc.	305.8	224.2
Garrison	Kerr Addison Mines Ltd.	1573.7	1541.2
Garrison	Noranda Exploration Co. Ltd.	360.0	266.1
Gauthier	Haas-Warner Mining Limited	239.3	236.2
Gauthier	Hill, R.	152.7	148.1
Gauthier	Hoffman Expl. and Minerals Ltd.	639.9	562.7
Gauthier	Leahy, M., Forbes, C.	31.7	0.4
Grenfell	Minorex Limited	983.3	895.3
Grenfell	Orcana Resources	241.0	228.9
Guibord	Amax Minerals Exploration	75.0	71.3
Guibord	Cominco Limited	589.5	2.3
Guibord	Johns-Manville Canada Inc.	62.2	1.0
Halliday	Canadian Arrow Mining Ltd.	927.4	10.5
Halliday	Chevron Standard Limited	2092.2	1695.3
Halliday	Noranda Exploration Co. Ltd.	106.7	48.5
Halliday	Northgate Exploration Limited	539.1	7.9
Harker	Amax Minerals Exploration	6116.2	5031.1
Harker	Canamax Resources Incorporated	815.0	684.9
Harker	Lenora Explorations Ltd.	1279.0	1203.3
Hearst	Amax Exploration Incorporated	111.3	68.6
Hearst	Amax Minerals Exploration	618.7	556.2
Hearst	MacGregor, R.A.	841.6	9.8
Hearst	Pelangio Larder Mines Ltd.	366.8	316.0
Hearst	Rivard, F.	47.8	47.2
Hearst	San Rafael Resources	312.1	3.5
Hearst	Sudbury Contact Mines Limited	1980.6	20.5
Hearst	Utah Mines Limited	240.2	2.5
Henwood	Stone-Eplett	2335.4	1923.9
Hinks	Newmont Exploration Canada Ltd.	782.1	742.3
Hislop	Ginn, A.P.	615.2	7.6
Hislop	Pamour Porcupine Mines Ltd.	122.5	3.0
Hislop	Young-Davidson Mines Ltd.	111.9	1.2
Hoblitzell	Noranda Exploration Co. Ltd.	178.8	101.1
Holloway	Amax Minerals Exploration	287.5	230.2
Holloway	Argentex Res. Exploration Corp.	1203.6	937.0
Holloway	Canadian Nickel Co. Ltd.	537.1	513.3
Holloway	Canamax Resources Incorporated	5489.1	3755.2
Holloway	McIntyre Porcupine Mines Ltd.	1563.1	1152.6
Holmes	Cunningham, L.	373.9	349.0
Holmes	Minorex Limited	598.1	516.7
Ingram	Marshall, F.	267.6	2.9
Katrine	Kiazyk, B.	283.5	283.5
Katrine	Lacana Mining Corporation	118.0	115.8
Katrine	Noranda Exploration Co. Ltd.	67.4	63.1
Kerrs	Denison Mines Limited	488.6	8.5
Knight	Sutherland & Associates	1577.4	1075.6
Knight	Timiskaming Nickel Limited	971.7	432.8
Knight	Whitegate Mining Company	289.6	30.5
Knox	Amax Minerals Exploration	111.0	77.0
Lebel	Eden Roc Mineral Corporation	92.4	81.4
Lebel	Haas-Warner Mining Limited	67.1	57.3

TABLE 7.5 Continued

Lebel	Lacana Mining Corp.	91.7	43.9
Lebel	Lampe Resources Co. Ltd.	246.0	237.7
Lebel	North Kirkland Mines	2648.0	2558.2
Lebel	Rio Tinto Canada Exploration	107.3	100.9
Lebel	Silver Lake Resources Inc.	6652.6	6321.3
Lebel	S.I.S. Resources	1224.1	1186.2
Lebel	Stewart, A.K.	91.4	0.5
Macmurchy	Madsen Red Lake Gold Mine Ltd.	160.1	6.2
Maisonville	Goliath Mines Ltd.	412.1	387.1
Maisonville	Lacana Mining Company	808.6	757.1
Maisonville	Noranda Exploration Co. Ltd.	302.4	135.6
Maisonville	Rio Tinto Canadian Expl. Ltd.	110.0	93.2
Marriott	Canamax Resources Incorporated	2562.3	2215.2
Marter	Rio Tinto Canadian Expl. Ltd.	105.8	73.7
McCool	Amax Minerals Exploration	131.0	77.0
McCool	Lee Geo-Indicators Limited	113.4	1.0
McCool	Placer Development Ltd.	1580.5	1077.4
McElroy	Amax Exploration Incorporated	937.8	739.8
McElroy	Amax Minerals Exploration	796.8	777.6
McElroy	Lampe Resource Company Limited	242.6	240.2
McElroy	Superior Northwest Incorporated	1262.8	13.2
McFadden	San Rafael Resources	308.1	3.5
McGarry	Amalgamated Larder Mines Ltd.	269.7	247.5
McGarry	Forbes, C. Leahy, M.	122.2	119.2
McGarry	Lampe Resource Company Ltd.	209.1	204.5
McGarry	Noranda Exploration Co. Ltd.	952.8	921.1
McGarry	Walker, J.O.	482.9	8.0
McNeil	Manville Canada Incorporated	142.4	2.0
McNeil	Noranda Exploration Co. Ltd.	133.8	88.7
McNeil	Weekley, L.	1469.1	1321.1
McVittie	Amalgamated Larder Mines Ltd.	1192.9	1084.9
McVittie	Rustraen, M.	587.3	7.3
McVittie	Lenora Explorations Ltd.	9209.4	8313.0
McVittie	MacGregor, R.A.	97.5	1.0
McVittie	Noranda Exploration Co. Ltd.	69.0	69.0
McVittie	Smith, L.	99.4	1.6
McVittie	Swansea Gold Mines Limited	798.4	561.0
Melba	Here Fault Copper Limited	1204.0	835.0
Melba	Rosario Resources Canada Ltd.	381.3	372.2
Michaud	Amax Minerals Exploration	221.0	187.0
Michaud	Redstone Resources Incorporated	700.4	570.9
Michaud	Renzy Mines Limited	2197.2	19.1
Midlothian	Larche-Rousseau	1133.7	17.2
Midlothian	Regal Goldfields Limited	1524.9	1473.6
Milner	Sutherland, D.	126.5	1.8
Montrose	Hanna Mining Company	90.4	66.9
Moody	Utah Mines Ltd.	844.9	756.2
Morrisette	Chorzepa, R.	121.9	121.9
Morrisette	Edda Resources Inc.	175.6	161.8
Morrisette	Merrick, A., Link, T.	156.4	152.1
Morrisette	Rosario Resources Canada Ltd.	769.6	617.8
Morrisette	Ward, J.T.	99.7	96.6
Munro	Amax Minerals Exploration	1927.7	1793.7
Natal	Sutherland & Associates	882.4	405.4
Natal	Timiskaming Nickel Limited	440.7	119.8
Newman	Noranda Exploration Co. Ltd.	310.8	189.3
North Williams	Metron Exploration Limited	30.8	1.0
Noseworthy	Newmont Exploration Canada Ltd.	926.1	780.2

TABLE 7.5 **Continued**

Ossian	Lacana Mining Company	163.1	128.0
Ossian	Noranda Exploration Co. Ltd.	127.7	120.1
Ossian	Rio Tinto Canada Exploration	124.5	112.0
Otto	Minorex Limited	292.3	275.9
Otto	Noranda Exploration Co. Ltd.	378.9	333.4
Otto	Reed, J.D.	93.6	84.7
Otto	Rio Tinto Canada Exploration	116.4	110.9
Pacaud	Laskowski, H.	317.6	310.0
Pense	Gereghty, G.J.	466.0	6.5
Pense	Hudson Bay Mining Limited	99.7	1.7
Playfair	Cunningham, L.	213.7	155.8
Playfair	Playfair Resources	311.2	225.0
Powell	Welsh, G.	121.6	1.4
Rattray	Noranda Exploration Co. Ltd.	214.0	2.3
Rickard	Amax Minerals Exploration	695.0	455.5
Robillard	MacDonald, N.W.	141.7	0.3
Robillard	Maidment, E.	94.2	94.2
Sangster	Shell Canada Resources Inc.	664.1	601.6
Skead	Canadian Nickel Company Ltd.	745.6	7.6
Skead	Noranda Exploration Co. Ltd.	223.4	2.3
Skead	Rio Tinto Canada Exploration	741.5	8.0
Skead	Superior Northwest Incorporated	607.1	6.7
Skead	Utah Mines Limited	445.4	5.0
Sothman	Manville Canada Incorporated	163.9	2.5
Stoughton	Nufort Resources Incorporated	857.3	798.7
Tannahill	Amax Minerals Exploration	164.8	119.8
Teck	Chorzepa, E.	61.0	59.7
Teck	Eden Roc Mineral Corporation	359.4	339.8
Teck	Forbes, C., Leahy, M.	274.6	271.6
Teck	Guaranty Trust Company	197.0	190.0
Teck	Harrington, P.	754.9	704.7
Teck	Labrador Exploration Limited	686.7	657.2
Teck	Lac Minerals	1050.4	990.2
Teck	Lake Shore Mines Limited	3523.5	2045.1
Teck	Marshall Minerals	164.9	163.1
Teck	McKinnon, D.	49.1	0.5
Teck	Newfields Minerals Inc.	1441.3	1323.6
Teck	Newmont Expl. of Canada Ltd.	1900.5	1806.2
Teck	S.I.S. Resources	156.1	153.3
Teck	Stewart, A.K.	244.9	233.4
Teck	Wright-Hargreaves Mines Ltd.	760.1	575.8
Teefy	Amax Minerals Exploration	994.0	541.6
Teefy	Canamax Resources Incorporated	1622.7	938.2
Thackeray	Noranda Exploration Company Ltd.	135.9	96.9
Tomlinson	Noranda Exploraiton Company Ltd.	406.4	217.0
Tweed	Utah Mines Limited	196.6	140.5
Tyrrell	Sutherland & Associates	309.4	133.2
Tyrrell	Timmins Gold Resources	1034.2	615.9
Walker	Canamax Resources Incorporated	114.0	65.4
Walker	Noranda Exploration Co. Ltd.	271.3	268.5
Walker	Surveymin Limited	340.4	273.7
Warden	Amax Minerals Exploration	195.0	100.4
Wilkie	Amax Minerals Exploration	177.0	130.8
Wilkie	Nahanni Mines Limited	579.8	527.1
Wilkie	Noranda Exploration Co. Ltd.	237.4	163.9
Zavitz	Newmont Exploration Canada Ltd.	640.3	502.8
Total		161074.2	116813.4

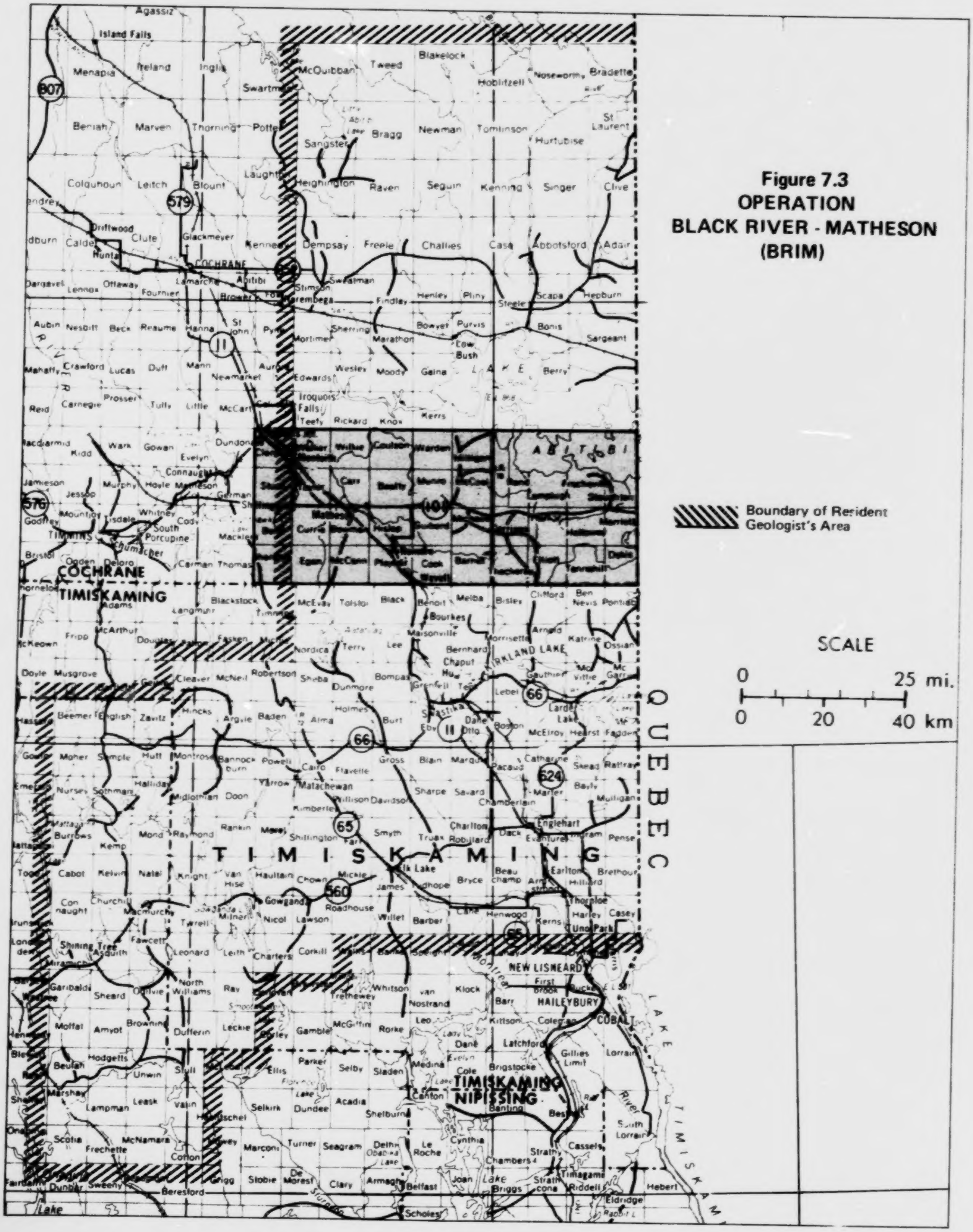

COCHRANE
TIMISKAMING
KIRKLAND LAKE
NEW LISKEARD
HAILEYBURY
COBALT
TIMMINS
ABITIBI
QUEBEC
LAKE TIMISKAMING
T I M I S K A M I N G
COCHRANE
TIMISKAMING
TIMISKAMING
NIPISSING
▨ Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km

Figure 7.3
OPERATION
BLACK RIVER - MATHESON
(BRIM)

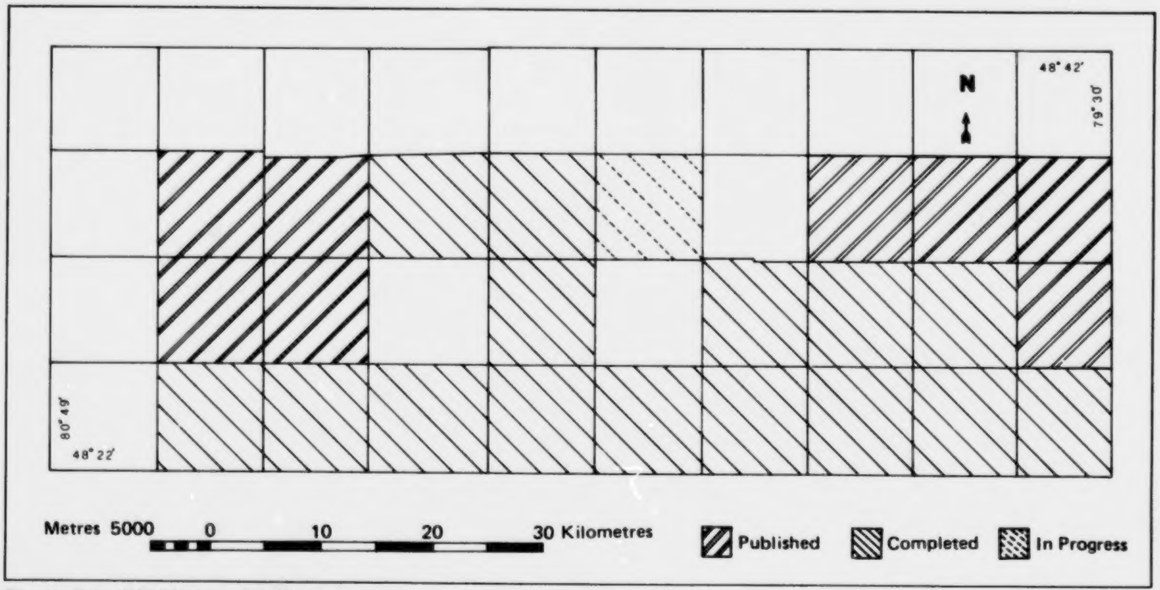


Figure 7.4 . BRIM Area GDIF Status

available during the first half of 1985. This map will be updated early in 1986 to incorporate the results of recent mapping by the Ontario Geological Survey in the BRIM area (as described above).

3. A mineralization occurrence map (scale 1:1 000 000) indicating the location of mineral showings within the BRIM area has been compiled from various provincial and federal sources.
4. A map (scale 1:100 000; reproduced as Figure 7.6) has been compiled that indicates the collar locations of diamond drill and Ontario Geological Survey sonic drill holes within the BRIM area, core for which is stored at the Larder Lake and Porcupine Mining Division Drill Core Storage Libraries.
5. Colour-contoured, calculated magnetic second vertical derivative maps for the BRIM area based on digital total field magnetic survey data released in 1984 (Lovell *et al.* 1985, p.166) (scale 1:100 000) were purchased late in 1985. The calculated magnetic second vertical derivative is one example of many enhancement techniques to which digital survey data are amenable. This enhancement of BRIM magnetic data resulted in substantially increased resolution of lithologic contacts and faults.
6. In cooperation with K.D. Kalicharran, BRIM Data Geologist, an investigation is in progress concerning the potential application of remote sensing data to mineral exploration. The study currently involves interpretation of Landsat multispectral scanner (MSS) and computer-enhanced MSS data, Seasat-SAR radar imagery, and stereoscopic analysis of black and white aerial photography. Preliminary results of this work suggest that in areas of up to 90% overburden cover, computer-enhanced MSS data can be effectively used to establish regional and semi-regional basement structural trends and to differentiate between basement lithologic (e.g. intrusive versus supracrustal assemblages) and volcano-stratigraphic (e.g. tholeiitic versus calc-alkalic) domains. On the contrary, aerial photography is better suited to extract basement structural trends of semi-regional to local extent and to establish the presence and effects of surficial features.
7. In cooperation with D. Guindon, Drill Core Library Geologist, Swastika, work is in progress to develop a locally accessible computerized geoscience database for the BRIM area. When operable, the system will allow the user to access cross-indexed data pertaining to Resident Geologist assessment and newspaper clippings files, core and rock samples stored at the Drill Core Storage Libraries, mineral showings, and appropriate references from scientific literature. The literature reference section of the database is currently operable and, as of December, about 800 keyword cross-referenced articles pertinent to the mineral potential of the BRIM area may be accessed via computer at Drill Core Storage Libraries in Kirkland Lake and Timmins.
8. BRIM poster displays were presented at the Matheson Fall Fair in August, at the Canadian Institute of Mining and Metallurgy Second District Three Meeting in Timmins, and at the Ontario Geological Survey Geoscience Research Seminar and Open House '85, in Toronto. An oral presentation outlining the BRIM Economic Geologist's program was also given at the Open House '85 (Bath 1985b).

TABLE 7.6 SUMMARY OF MINERAL SHOWINGS VISITED DURING 1985 BY THE BRIM AREA ECONOMIC GEOLOGIST

(Numbers correspond to localities on FIGURE 7.5)

Property Name	Commodity	Host Rock	Alteration	Ore Minerals
1. Aljo	Au	mv	sil,carb,py	py,cp,asp,sph,po,tell,Au
2. American Eagle	Au	greywacke	carb	py
3. Anderson	Au	mv	sil,carb,hem,gt	py,gal,sph,cp,bn,Au
4. Bambi	Au	mv,vm	sil,carb	py
5. Bay Resources	Au	esker sands and gravels	--	mt,Au,Hg
6. Black River	Au	mv	carb	py,cp
7. Blue Quartz	Au	mv	carb,sil	py,asp,po,gal,sph,cp,tell,Au
8. Buff-Munro	Au	mv	carb,sil	py,sph,gal,asp
9. Clavos	Au	mv,uv,arg	ser,carb,sil	py,asp
10. Croesus	Au	mv	carb,ser,sil,py	py,asp,Au
11. Currie, N1/2 lot 1,con II	Au	mv,vm	amph,carb,sil,gt,cord(?)	py,cp,po
12. Dominion Gulf	Au	vm,mv	carb,sil,hem,py	py
13. Fournier	Au	iv	--	py,po
14. Gelinas	Au	vm,mv	carb,sil	py
15. Golden Harker	Au	mv,vm	carb,sil,hem	py,cp,gal
16. Gold Pyramid	Au	greywacke	sil,carb,ser	py,cp,gal,Au
17. Hyde	Au	gabbro	sil	py,cp,mo
18. Iris	Au	mv,vm	sil,carb	py,cp,gal
19. Lucky Ben	Au	mv	ser,carb,sil,py	py,asp,sph,Au
20. Maude Lake	Au	mv	ser,carb,sil,py	py,asp,sph,Au
21. Mobb	Au	mv	sil,carb	py,cp,mo
22. St. Andrew Goldfields	Au	mv	carb,ser,sil	py,cp,asp,Au
23. Sylvanite No.1	Au	vm,mv	sil,carb	py,sph,gal,cp
24. Sylvanite No.3	Au	porphyry	sil,ser,carb	py,Au
25. White-Guyatt	Au	greywacke	carb,ser,sil	py,po,gal,sph

ABBREVIATIONS

amph - amphibole
arg - argillite
asp - arsenopyrite
bn - bornite
carb - carbonitization
cord - cordierite
cp - chalcopyrite
gal - galena
gt - garnet
iv - intermediate volcanic rocks
mo - molybdenite
mv - mafic volcanic rocks
ser - sericitization
sil - silicification
po - pyrrhotite
py - pyrite
tell - telluride
uv - ultramafic volcanic rocks

Copies of all compilation maps as well as the calculated magnetic second vertical derivative maps are available for examination at the offices of the Resident Geologist in Kirkland Lake and in Timmins, as well as at the Larder Lake Mining Division Drill Core Storage Library, in Swastika.

ECONOMIC POTENTIAL

The potential for the Black River-Matheson area to host economic gold mineralization is excellent. Of 252 documented mineral occurrences, showings, and mines within the area (Bath 1985a, Figure 2), 198 (or 78%) contain gold as their principal commodity. Generally, a documented assay value of 0.01 troy ounce of gold per ton is the minimum criterion for a gold occurrence. Considering that more than 90% of bedrock in the area has not been intensively explored by conventional prospecting and that outcrop exposure is <10%, the real significance of the number of showings and the area's potential to host additional deposits becomes apparent. Areas particularly worthy of further exploration efforts are discussed by Bath (1985a) and below.

PROPERTY VISITS

The numbers in parentheses after the name correspond to the numbered locations on Figure 7.1.

R. ANNETT AND R. FERGUSON GOLD OCCURRENCE (1), Asquith–Churchill Townships Boundary Area

Near the southern end of a stripped area, the base of a basalt flow is irregularly banded and slightly altered; possibly, the flow incorporated some of the substrate over which it flowed. To the north is white feldspar porphyritic (possibly calc-alkalic) basalt containing feldspar phenocrysts <3 mm long, and fractured abundantly. Fractures are filled with white quartz-carbonate stringers and alteration, pyrite comprising <10% of the stringers and alteration. Farther north is a rock trench blasted into white feldspar porphyritic (phenocrysts <1 cm) basalt. North along the stripped area is fine-grained basalt with areas of steam explosion breccia <0.3 m wide. The northern extremity of the stripping is pillowed porphyritic basalt striking 320°, dipping steeply and having tops to the northeast.

About 125 m to the southwest is stripped fine-grained basalt cut by many parallel, and other orientations of, white quartz-carbonate veins, and a flow base (either that described in the first stripping men-

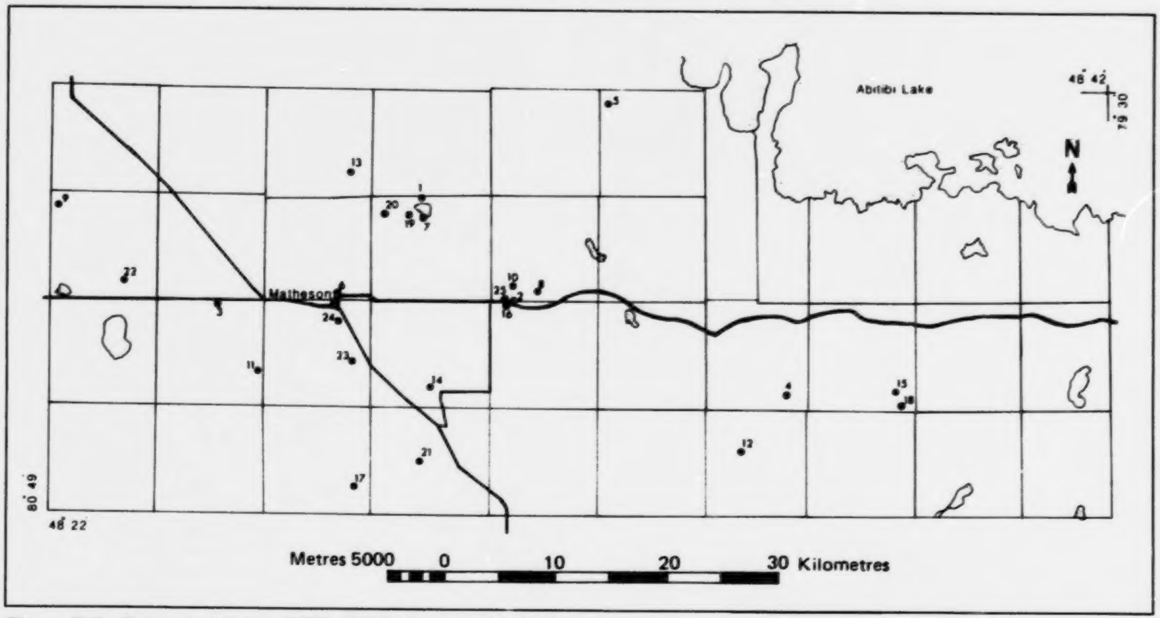


Figure 7.5 . Property Visits, 1985: BRIM Economic Geologist

tioned, or a flow below it). An interflow sedimentary source of the gold in the quartz-carbonate veins and alteration may be in the gully between the two stripped areas. Upon asssay, float in the gully yielded wolfram (Ralph Ferguson, prospector, Matachewan, personal communication, 1985).

E.A.M. ARMSTRONG GOLD OCCURRENCE (2), Asquith Township

Stratigraphy where stripped near Mosson creek is, from south to north (probably top to bottom):

Massive basalt base of overlying basalt

Sheared rusty possible interflow sedimentary rock cut by chalcopyrite-pyrite-gold-bearing quartz veins (general attitude 230°/dip steep southeast) 1 m wide

Brecciated white and green banded chert

Boudinaged banded interflow tuffaceous sedimentary rock

Sheared banded flow-top breccia

Coarse-grained flow-bottom breccia

Cherty tuff interspersed with mattress pillows

Up hill 200 m, stripping near the Tom Saville shaft exposes the stratigraphy as follows (south to north):

Medium-grained basalt

Quartz veins (attitude 085°/dip 80° north) with rusty streaks from leaching carbonate and pyrite

Quartz veined cherty tuff and other rocks fractured closely-spaced subparallel

Mixture of basalt and cherty tuff cut by rusty mafic dikes

BAY RESOURCES AND SERVICES INCORPORATED PLACER GOLD PROSPECT (3), Milligan Township

Appreciable concentrations of gold were recovered during summer 1985 by sluicing and magnetically beneficiating esker magnetic black sand and gravel that are vegetated over by Jack Pine and sparse underbrush, below which is forest floor consisting of organic debris and rusty mineral soil 0.3 m deep.

One location of gold-bearing sediments is the flank of a dry kettle depression. The gravel here has open framework (river current deposit), i.e. the fines are not greatly winnowed out (and thereby upgraded) by beach action, nor are strand terraces evident. Some placer gold grains are fine gold, others are with anhedral to euhedral pyrite grains, or with silver, or amalgamated with mercury, etc.

In one section, the black sand is indicated by a magnetometer survey to be present in an area 1200 by 200 m. Depth of the gold-bearing black sand is being determined.

B. BOLDUC GOLD PROSPECT (4), Asquith Township

Stripping by bulldozer blade followed by pressure hose has exposed glacially polished bedrock 65 m up (westward) from the west shore of a north-trending pond that is south of Speed Lake and east of Frith Lake. The northern stripping exposes, from east to west (top to bottom):

Thick bedded feldspar-sericite-quartz-chlorite rock

1 m wide thinner bedded feldspar-sericite-quartz rock

1 m wide green carbonate rock

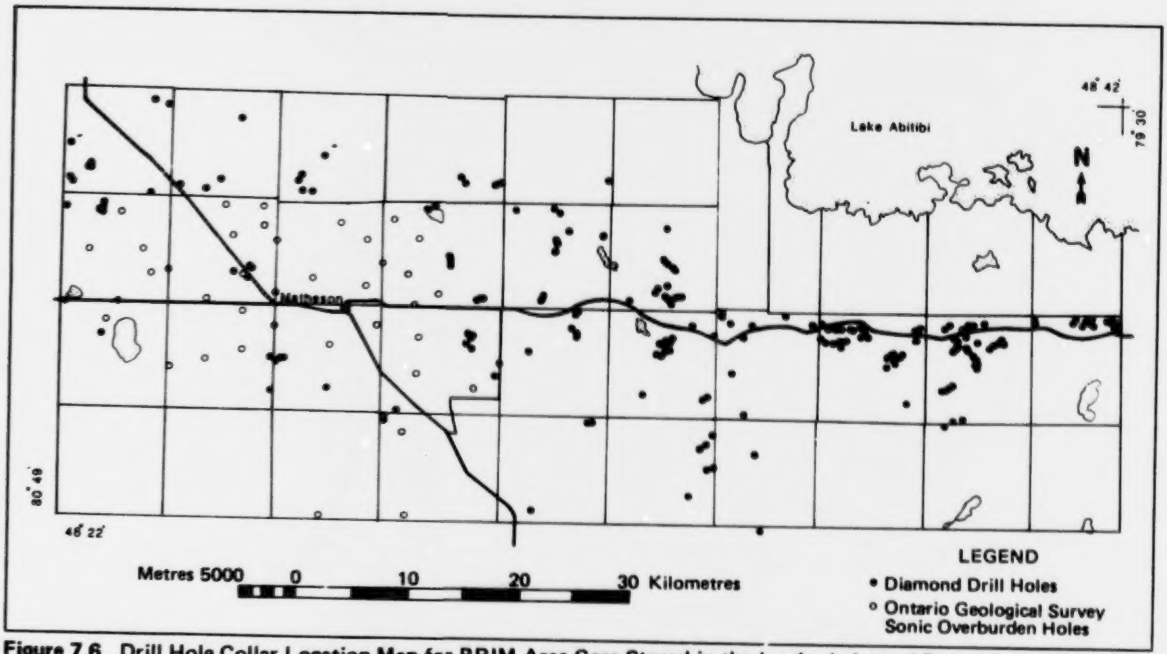

Lake Abitibi
48°42'
79°30'
N
Matheson
80°49'
48°22'
Metres 5000 0 10 20 30 Kilometres
LEGEND
• Diamond Drill Holes
○ Ontario Geological Survey Sonic Overburden Holes

Figure 7.6 . Drill Hole Collar Location Map for BRIM Area Core Stored in the Larder Lake and Porcupine Mining Division Drill Core Storage Libraries

Massive feldspar-sericite-quartz rock that has 1 to 2 cm thick dark chilled margin and pink (hematitized) parts cut by quartz-tourmaline-chlorite veins, and in its western part contains irregularly shaped chloritic inclusions

Shaft

Basalt cliff

Present also are gabbro dikes and sills that have been carbonatized perhaps by intruding and absorbing green and other carbonate rock. The gabbro is associated with quartz that occurs as internal gash veins and also as veins emanating short distances from the gabbro. Gold is associated with quartz.

BRITISH MATACHEWAN GOLD OCCURRENCE (5), Powell Township

Claim MR 53921 main showing is in Gowganda Formation conglomerate common to the area; greenish grey matrix and many pink feldspar-white quartz (granitic and vein sources), chert, basalt and other pebbles, indicating the coarse epiclastic fraction may be rather far from source. This is not a basal conglomerate; its distance above Archean basement rocks is not known.

The conglomerate is cut by quartz veins in a zone 5 m wide, in which younger (cross-cutting) rusty quartz-carbonate veins trending 020° and dipping subvertically contain pyrite, chalcopyrite, and gold. A selected grab sample contained 0.163 ounce gold per ton (John Shirriff, prospector, personal communication, 1985). The EM 15 anomaly trends 050° through where the gold occurrence is exposed, and may be tested by an angle hole collared down hill and diamond drilled towards the northwest. If basement rocks are encountered, an attempt would be made to intersect rocks at the contact between two flows.

A 6 m wide diabase dike intruding Gowganda Formation sedimentary rocks trends 310° through several claims. Plans are to explore the dike and wall rocks at the dike's intersection with the projected extension of the gold ore zone of Matachewan Consolidated and Young-Davidson past producers. One purpose is to locate if and where their ore zones (which are in Archean basement rocks) extend under the covering Proterozoic sedimentary rocks.

DALY GOLD PROSPECT (6), Catharine Township

Rock as well as soil have been removed, long ago, in trenching that follows gold-bearing quartz veins across a northwest-trending northeast-facing cliff. West of the cliff is relatively fresh (unaltered) basalt with pillows indicating tops are to the northeast.

The cliff face is composed of stratabound sericitic black silicified rock that is largely interflow sediments. Instead of diamond drilling the quartz veins, which parallel stratification, future drilling is planned to drill perpendicular to the strata. The hole is to be collared up hill in the footwall basalt, so as to intersect the entire thickness of interflow sedimentary rock (confirmed by drilling a short distance into basalt presumed to overlie the sedimentary rock). This way the location of the upper contact of the sedimentary rock under the low ground's soil cover can be ascertained.

R. FERGUSON AND R. ANNETT BARITE AND CHALCOPYRITE OCCURRENCES (7), North Williams and Dufferin Townships

Most of the barite is in veins cutting the Cobalt Embayment's westernmost area of Lorrain Formation, both in the Lorrain Formation near where it is cut by Nipissing Diabase, and in veins cutting the diabase. Some of the barite is white, and some is reddish. Most of the Lorrain Formation is feldspathic sandstone that is relatively uniformly brownish red coloured, and contains a few sand-sized white vein quartz epiclasts and grains of magnetite.

Some of the barite is disseminated in Lorrain sandstone, and some forms subconcordant or concordant lenses and streaks. This Lorrain sandstone is feldspathic, reddish and greenish grey coloured, and contains white vein quartz pebbles, calcite, and disseminated pyrite partly replaced by chalcopyrite. In parts of a stratigraphic section exposed 3 m thick, chalcopyrite forms about 0.5% of the rock. Disseminated chalcopyrite is present in places in Lorrain orange-coloured sandstone throughout an area 0.2 km in diameter. Assays of silver have been obtained from the copper-bearing Lorrain sandstone (Roy Annett, prospector, Shining Tree, personal communication, 1985).

GOSSELIN GOLD PORSPECT (8), Churchill Township

Along the bulldozer trail 125 m from the Chief Stewart Saville gold discovery (on a small, partly stripped peninsula that juts into West Shining Tree Lake), is bedrock stripped of its soil cover. The stratigraphic section exposed is (northeast to southwest, probably top to bottom):

Pillowed basalt (tops northeast?)

Massive fine-grained basalt

Sheared chlorite-sericite-dolomite sedimentary rock 3 to 8 m thick, containing disseminated pyrite, and cut by quartz-carbonate veins roughly parallel to the contact with basalt and by gabbro sills <0.3 m thick.

More massive, less rusty less chloritic sedimentary rock that has some beds that contain lithic fragments and that are stretched to the extent of being boudinaged. Sand to silt-sized buff-coloured beds average 1 cm thick, and grey mudstone beds are 1 to 2 mm thick. Near the western limit of the exposure is gold-bearing carbonate rock containing 0.5% to 2% disseminated pyrite and cut by quartz-carbonate veins the wall rocks of which are bleached to buff colour.

On the peninsula and 30 m southwest of the main stripped area are dikes of white feldspar porphyry, parts of which have chloritoid alteration.

D. HYDE AND L. HUBERT GOLD OCCURRENCE (9), McCann Township[1]

[1]concession II, lot 2

Amphibolitized recrystallized basalt and interflow sedimentary rocks are intruded by syenitic rock. The basalt has coarsened grain sizes apparently varying directly with proximity to the metasomatic effect of syenite, and in places contains magnetite. Coarsest grained basalt has mafic minerals extending dendritically from points of nucleation. The needles of pyroxene or actinolite are a maximum of 4 cm long.

At the main showing, the metamorphosed basalt is cut by disseminated pyrite-bearing reddish syenite porphyry and syenitization and biotite lamprophyre dikes, and by bluish grey molybdenite-bearing quartz veins that contain pyrite, malachite, and chalcopyrite, and have pyrite more abundant in the wall rocks. The wall rocks contain chlorite, some of it forming slips, and a little epidote. The highest assays were 0.25 and 0.64 ounce gold per ton, with many at 0.003 ounce gold per ton, and minor amounts of silver, molybdenum, copper, zinc, and arsenic. Diabase dikes trend north and probably form part of the Matachewan swarm. Gowganda Formation conglomerate and red sandstone cover an eastern part of the claim group, around Morland Lake.

The gold mineralization resembles somewhat the Playfair Township "Arrow" past producer of Pamour Porcupine Mines Limited, and the Garrison Township "Murphy" past producer of Kerr Addison Mines Limited, although this McCann Township mineralization is deeper in the cupola of a syenite porphyry stock and consequently is in host rocks of higher metamorphic grade.

KIRKLAND BASIN GOLD PROSPECT (10), Teck Township

Newfields Minerals Incorporated diamond drilled several thousand metres through the Kirkland Lake North Break, beginning a series of 1000 m holes to test the North Break above the 3075-foot (930 m) level. Newfields Minerals Incorporated also examined the long (more than 1 km) crosscut from Lake Shore No. 5 shaft 3075-foot level station to a short distance above the base of the Timiskaming Group. Much of what appears on old maps as intrusive rocks (e.g. syenite, syenite porphyry, or quartz-feldspar porphyry) are trachytic extrusive rocks, and debris flows and other sedimentary rocks.

LAKE SHORE MINES LIMITED GOLD PRODUCER (11), Teck Township

Since Lake Shore Mines Limited was put back into production in 1983, mining is trackless, being on upper levels accessible for scoop trams via a decline ramp, and using jumbo drills and a mining method perfected in France. Plans are to use this method for ore accessible via Lake Shore No. 5 shaft.

The mining method consists, in part, of repeatedly mining out a drift face 4 m high (as much as 12 m wide in upper levels), then covering the drift floor with sand 0.3 m thick, laying plastic sheeting over the sand, backfilling with concrete, and (after the concrete is cured) mining underneath. The cement backfill pipe is not clogged by this process because it is in the sand on the drift floor. The concrete is reinforced every 0.6 m, at angles that constitute the best pattern, so this mining (including stoping) method might serve down to the bottom level of 3950 feet (1200 m) of Lake Shore Mines Limited's active vertical shaft No. 5, if exploration outlines adequate ore reserves.

MAUDE LAKE GOLD MINES LIMITED GOLD PROSPECT (12), Beatty Township

From 1917 to 1920 a decline shaft was sunk, with levels at 100 and 200 feet (lateral work totaling 470 feet), and a 50 tons per day mill was built. In 1946 and 1947, Sylvanite diamond drilled 20 000 feet. For the past five years, a sustained program of exploration has been carried out, financed privately. The program has included diamond drilling, stripping of Great Clay Belt glacial lake bottom soil and underlying till, and rock work from which (in 1984) a bulk sample of 1000 tonnes was sent to a custom mill and (in 1985) 15 000 tonnes were passed through a sampling tower. Subsequently, the bulk sample from the sampling tower (about 3 tonnes) was analyzed.

Strata strike northwest, and include a komatiite (magnesium-rich ultramafic) flow to the northeast (top), underlain by sulphide-rich interflow sedimentary rock in places carbonaceous, underlain by flow top breccia or welded tuff (contains rounded fragments, some of which have selvages), underlain by a pillow-topped tholeiitic basalt flow. The tholeiitic basalt has some pillows rimmed by massive sulphide mineralization, and is altered and cut by gold-bearing quartz-carbonate veins.

These veins are transitionally white to greyish black, and contain marginal and disseminated carbonate (weathers rusty buff coloured), and are flanked by wall rock alteration. Most gold is in pyrite, although some is refractory in arsenopyrite; gold concentrations vary as to the amount and type and nature of vein quartz (R. Bennett, Consultant Geologist, Sudbury, personal communication, 1985).

MONCRIEFF GOLD PROSPECT (13), Catharine Township[1]

[1]concession III, lot 5, north half

Rocks including "green carbonate rock" (green mica, sericite, chlorite, dolomite, quartz, siliceous laminae, pyrite) are cut by quartz-tourmaline veins. Rocks stratigraphically above and below (respectively to the east and west) are basalt flows. Where subparallel to each other and the flows, gold-bearing carbonate veins may represent recrystallized and subsequently sweated-out siliceous beds, or else some of the silica came from pyroxene or olivine of the basalt that flowed over a carbonate-rich interflow sediment. Diamond drilling is planned that will cross-section the contact zone between flows, from hanging wall to footwall.

NEELANDS-THOMPSON GOLD OCCURRENCE (14), Asquith Township

Bedrock types are green carbonate, basalt, syenite porphyry, intrusive and fragmental quartz-feldspar porphyry, and carbonate-quartz-pyrite (fine-grained)-chromium muscovite rock. Six feet (almost 2 m) of the latter rock contained 0.16 ounce gold per ton (6 g per tonne) according to Ralph Ferguson (personal communication, 1985). The syenite porphyry consists largely of reddish feldspar phenocrysts in a matrix of chlorite and pink feldspar, and resembles porphyry at Young-Davidson past producer that was mined there for its disseminated as well as quartz vein content of gold. Another rock type here that elsewhere contains gold and could be followed by geophysics, stripping of soil, and diamond drilling is quartz-sericite-pyrite (e.g. 2%) schist.

PACESETTER GOLD OCCURRENCE (15), Churchill Township

Rock types present in diamond drill core around the drill sites are basalt, rusty carbonate rock, and sericitic-quartz "eye"-white feldspar rock. Core from carbonate rock and quartz-carbonate veined rocks was split. Assays obtained a maximum of 0.2 ounce gold per ton according to prospectors Roy Annett and Ralph Ferguson (personal communication, 1985), who think that the zone may extend through Oddur Lake to Ian Lake.

F. AND P. RIVARD AND L. RAITANEN GOLD OCCURRENCE (16), Eby Township[1]

[1]concession IV, lot 2, south half's southwest quarter

Polymictic conglomerate (pebbles of quartz, basalt, rhyolite, sulphide mineralization, argillite and so on) has open framework, although coarse epiclasts form 30% of the rock. Some imbrication is present. Interbeds are irregularly banded chlorite-feldspar-carbonate-sericite rocks. The environment of deposition may have been shoreline (beach or eroded delta).

Syenitization is evident from the presence of hematitization (reddening) and lamprophyre dikes. Stratigraphically below (to the southeast) is sulphide facies iron formation presumably deposited in an offshore (littoral) reducing or deep water (euxinic?) environment. Transitional between deltaic and offshore environments, shallow shelf gold-accumulating sediments should be present if the environment was not changed suddenly (e.g. by volcanic or seismic activity).

C. SHEA GOLD OCCURRENCE (17), Maisonville Township

Volcanic flows are iron-rich tholeiitic basalt of the Kinojevis Group, which filled an original basin extending from Matheson to Kirkland Lake, Ontario, and eastward to Malartic, Quebec.

The Kinojevis Group never hosted a successful gold mine until the Harker-Holloway Townships discoveries being currently developed, despite Maisonville Township having more gold occurrences on the Timmins-Kirkland Lake Map 2205 than any other township. One deterrent to discovery of mineable gold is scarcity of (or failure to find) gold-bearing interflow sedimentary rock. Another problem is that diamond drilling tended to be directed to intersect native gold-bearing white quartz-carbonate veins and pyritized wall rocks at right angles. Most veins fill cooling fractures roughly perpendicular to flow contacts, and are only as long as the flow is thick, presumably having steamed up from what the basalt flowed over. Most flows are 30 to 150 m thick. In contrast, substantial ore zones in the general area are in shears and interflow sedimentary rocks subconcordant to concordant with stratigraphy and of considerable extent along strike and down dip.

Therefore, future diamond drilling might be directed perpendicular to stratification.

Tops are to the east. Upper parts of flows are distinguished by pillows and below them varied texture (i.e. areas of massive white feldspar containing acicular mafic mineral) in an overall matrix of medium-grained basalt. Deeper parts of flows are more uniform medium-grained basalt.

Carbonatization occurs as streaks trending east, perpendicular to flow contacts, and is characterized by white median quartz-carbonate veins averaging 1 cm wide, subparallel and closely spaced. Wall rocks are bleached (carbonatized) and contain disseminated pyrite associated with gold.

Pink and grey feldspar porphyry dikelets are characteristic late differentiates of tholeiitic basalt, and rarely contain much gold although larger bodies of this type of porphyry can heat-pump pre-existing gold into traps. Gas vesicles in a porphyry dike indicate it was intruded when load pressure on the flow was not great.

RECOMMENDATIONS FOR EXPLORATION:

As a result of gold discoveries at Hemlo, in Harker-Holloway Townships by Barrick Resources Corporation and Canamax Resources Incorporated; and in Ligneris, Casa Berardi, and Estrades Townships in Quebec by Vior Mining Exploration Company Incorporated, Inco Limited and Teck Corporation respectively, thousands of mining claims have been staked along the contacts between volcanic and sedimentary rocks crossing the Ontario-Quebec Boundary. Features characteristic of most gold ore zones are the following:

1. Gold ore zones occur along the contacts of volcanic with sedimentary rocks, both the contact of a large belt (or remnants of a large belt) of volcanic with a large belt of overlying sedimentary rocks, and alternately along sedimentary rocks within predominantly volcanic terrane.
2. Conglomerates and related grey wackes are within 1 km away along strike.
3. Sources for the gold ore host sedimentary rocks (and sediments absorbed into and thereby altering and imparting a foliated appearance to overlying flows, most of which are tholeiitic and komatiitic basalt) are mainly subaerial edifices of calc-alkalic volcanoes such as described by Rocheleau and Dimroth (1985). In the Larder Lake Mining Division, erosion of the calc-alkalic Skead Group provided sediments for the Larder Lake (Kerr Addison gold producer) area sedimentary rocks; similarly, the Halliday Township calc-alkalic dome supplied most of the sediments west of Matachewan; and erosion of topographically high land where now occupied by upper Lake Abitibi trondhjemite-tonalite rocks supplied most Matheson-to-Holloway Township sediments.
4. Most gold ore is in concordant linear bedrock topographic lows, probably resulting from the susceptibility to erosion of stratabound "shear zone" interflow (clastic and pyroclastic sediments, chemically cemented) sedimentary gold ore's gangue minerals sericite, pyrite, carbonate, "graphite", etc. Within the linear bedrock topographic lows, however, the best ore can be relatively high bedrock topography (because of high silica content) compared to submarginal ore.
5. Gold ore is in magnetic lows (partly because magnetite was converted to hematite, pyrite, etc.) within magnetically high regions. Many of these magnetic lows parallel stratigraphy.
6. Dips of gold ore zones typically flatten at depth (tending to "migrate" down dip onto neighbouring claims) perhaps because of original delta apron slope.
7. Gold ore zones plunge east or west roughly along strike (concordant to subconcordant with stratigraphy), perhaps because of steepening the dip of the delta apron's original arcuate shape.

The great majority of gold mining discoveries were made by basic prospecting of bedrock topographic highs (outcrops), which expose an average of <5% of total bedrock surface. In contrast to outcrops, zones anomalous in gold tend to be bedrock topographic lows covered by overburden, such as under muskegs or, in the words of Harry Oakes before he discovered the Lake Shore gold mine (produced 8.5 million ounces of gold) at Kirkland Lake, "Everyone knew that the richest ore is under the lakes in this country" ("Lake Shore" *in* The Northern Miner, March 6, 1952). Therefore, "rules of thumb" to quickly zero in on and thereby accelerate the frequency of gold discoveries are the following:

a) Detect rock type contacts by magnetic surveys, e.g. helicopter-borne gradiometer.

b) Identify the topographically lowest bedrock that is concordant with strata by estimating overburden thickness, which can be done by interpreting electromagnetic surveys (Pitcher 1985) and by compiling water well, overburden drilling, and diamond-drill hole casing information such as on Data Series and Geological Data Inventory Folio maps of the Ontario Ministry of Northern Development and Mines and its predecessors.

c) Diamond drill these coincident bedrock topographic and magnetic lows, spotting follow-up holes guided by the sedimentary rock's environment of deposition (along strike basinward from the greywacke towards the chemically cemented fine-grained sediment, which now is quartz-sericite-pyrite + carbonate schist, but not as far offshore as the turbidites).

Where "porphyry" syenitic rocks (which originated by volcanic and sedimentary rocks subsiding until they partly melted, according to Jensen and Langford 1985, p.35 and 95) intrude through gold ore zones such as described above, they heat pumped ahead of them (e.g. Pamour "Arrow" and Kerr Addison "Murphy" past gold producers) and/or incorporated into themselves (e.g. in cooling fractures, in the case of Kirkland Lake gold ore) pre-existing gold ore zones they remobilized.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

PRECAMBRIAN GEOLOGY SECTION

L.S. Jensen continued synoptic mapping of the Kirkland Lake and Larder Lake areas; part of a multi-year program to remap a 24-township area in the Archean Abitibi Subprovince. The 1985 field season focused on the geology between the Round Lake Batholith and the Kirkland Lake-Larder Lake Fault zone.

R. Johnstone and N.F. Trowell continued mapping in McCool, Hislop, Guibord, and Michaud Townships as part of a program to carry out detailed, synoptic, and stratigraphic mapping along the Destor-Porcupine Fault from east of Timmins to the Quebec border (BRIM).

ENGINEERING AND TERRAIN GEOLOGY SECTION—GEOPHYSICS/GEOCHEMISTRY SECTION

C.L. Baker, M.B. McClenaghan, and K.G. Steele did a reconnaissance heavy mineral and geochemical backhoe sampling project of the Munro Esker. Sampling took place in an eight-township corridor which straddles the esker from Michaud Township in the south to Kerrs Township in the north. A total of ninety-six 8 to 10 kg samples were collected from 2 to 3 m deep trenches (BRIM).

C.L. Baker, K.G. Steele, and M.B. McClenaghan continued the reconnaissance till sampling program in the Matheson-Lake Abitibi area. In 1985, 241 till samples were collected from 312 backhoe trenches and 60 sonic drill holes totaling 2595 m were drilled (BRIM).

GEOPHYSICS/GEOCHEMISTRY SECTION

D.H. Pitcher evaluated the effectiveness of electromagnetic measurements in deriving electrical conductivities and thickness of multi-layered Quaternary stratigraphy. The overburden sonic drill hole logs were used in conjunction with the airborne data released in 1984 and the combined EM-31/EM-34 instrumentation results (BRIM).

MINERAL DEPOSITS SECTION

D. Long and A.C. Colvine continued studies of the Huronian Supergroup designed to evaluate sedimentological controls on placer gold deposits. Studies in 1985 concentrated on completion of preliminary maps of Huronian strata in Sheard, Ogilvie, Amyot, Browning, Hodgetts, Unwin, Lampman, and Leask Townships; and adjacent parts of North Williams, Dufferin, Stull, and Valin Townships.

J. Malczak investigated the Maude Lake Gold Mines Limited gold deposit in Beatty Township (BRIM).

J. Malczak studied the industrial mineral potential of the Black-River Matheson area. The most significant possible sources (excluding asbestos) are: serpentine filler minerals from the Hedman Mine in Warden Township; alkali feldspar flux minerals from a horneblende syenite phase of an intrusion in Egan Township; talc-magnesite from a peripheral zone at the former Johns-Manville Munro Asbestos Mine in Munro Township; and monument/facing stone from the Garrison stock in Garrison Township (BRIM).

D.G. Troop studied the geology and metasomatism at the Ross Mine and vicinity (BRIM).

P.J. Whittaker continued the metallogenetic studies of the Black River-Matheson area by doing detailed mapping of the Croesus and White-Guyatt deposits in Munro Township, in west-central Thackeray Township and northeastern Harker Township (BRIM).

BRIM (Operation Black River-Matheson), funded equally by the Ontario Ministry of Northern Development and Mines and the Ontario Ministry of Natural Resources, is a multi-year geoscience program which covers a 40-township block straddling Highway 101 east of Timmins (Night Hawk Lake) to the Ontario/Quebec Border. The objectives of this program are to provide a comprehensive and integrated geoscience database; to develop a regional stratigraphic and metallogenetic framework; and to promote new mineral exploration strategies and development in the BRIM area.

RESEARCH BY OTHER ORGANIZATIONS

GEOSCIENCE RESEARCH GRANT PROGRAM

McMaster University

J.H. Crockett and R.J. Bowins

Grant 132: Rare Earth Element Properties of Archean Iron Formations and Their Host Rocks—Some Results from the Temagami and Boston Iron Formations.

H.P. Schwarcz and C.E. Rees

Grant 202: Sulphur Isotope Studies of Archean Gold Deposits.

McMaster University/University of Toronto

J. Ozoray, F.J. Wicks, and M.D. Higgins

Grant 138: Mineralogy and Geochemistry of the Chrysotile Asbestos Deposits of Ontario: A Progress Report on the Stable Isotope and Boron Survey.

Queen's University

I. Nichol and G.S. Shelp

Grant 192: Geochemical Exploration For Gold.

D.J. Toogood and C.J. Hodgson

Grant 227: A Structural Investigation between the Kirkland Lake and Larder Lake Gold Camps.

EXPLORATION TECHNOLOGY DEVELOPMENT FUND (ETDF)

Morris Magnetics Incorporated

W.A. Morris

Grant 051: Development of a Field Portable Technique for the Analysis of the Magnetite, Hematite and Ilmenite Content of Basal Tills.

X-Ray Assay Laboratories Limited

J.S. Fox, T.E. Eagles, and E.J. Brooker

Grant 090: The Application of Lake Sediment Surveying to Au Exploration in Ontario.

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8. Cobalt Resident Geologist Area, Northeastern Region

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INTRODUCTION

Although commodity prices remained at depressed levels in 1985, a certain degree of stability, absent for the past decade, returned to the marketplace. Silver was the most important commodity produced in this area and closed out the year at U.S. $6.12; a drop of 13% from a year earlier. This drop fairly accurately reflects the overall trend in mining and exploration in this area during 1985. Both activities declined marginally from last year but remained at relatively high levels.

Two new developments in the Cobalt camp include the recent discovery of a new outcropping of a high-grade silver vein and renewed exploration of Sulpetro Minerals Limited's large land holdings by Canadaka Mining Corporation. In addition, Silverside Resources Incorporated and Silver Lake Resources Incorporated are in the final stages of decline construction at their Lorrain Township Silver Occurrence and should reach the inferred ore zones during the Spring of 1986.

Exploration and development of the area limestone and dolomite reserves expanded at a rapid rate, primarily due to hopes that a new pellet fluxing project, being developed at two local iron mines, will require local material.

Gold exploration activity in the Temagami greenstone belt continued to increase as a number of large companies acquired ground and initiated modest exploration programs during the year.

Negative developments for the area include the recent appeal by the Temagami Indian Band, of a ruling made in favour of the Provincial Government last year, regarding resolution of a long-standing land claim. This claim has effectively stifled exploration for the past decade. The appeal will, no doubt, result in a continuation of the Land Caution for some time to come. In addition, Silver Century Explorations Limited and Agnico-Eagle Mines Limited have given up, for now, on the old King Edward Mine and recently pulled the pumps. The mine workings were dewatered in 1980 and intensively explored since this time. In March, the Langis Mine was downgraded from producer to an exploration-only basis. Further, Agnico-Eagle Mines Limited reduced their area work force by virtually 50%.

The many research projects initiated in the past few years are continuing and several new projects, funded by SPARC (Special Projects Assisting Resource Communities) have recently been started by this office. They are described in more detail in the following section. These projects are aimed at expanding the local economic base and providing new data to assist in finding and developing new commodities and at expanding our knowledge of the geology and ore forming processes in the camp.

RESIDENT GEOLOGIST'S ACTIVITIES

During the year, the Cobalt office was staffed by Leo Owsiacki, Resident Geologist, and contract personnel including P. Anderson, Resource Geologist; K. Larabie, Secretary; C.D. Van Leeuwen, Secretary; R. Larsen, Contract Geologist; W.T. Grant, Contract Geologist; E.M. Dodd, Contract Geologist; L. Francis, Draftsman; A. La Bine, Geological Assistant; M. Gabbani, Junior Assistant; A. Marvin, Junior Assistant; A. Conti, Experience '85 student, and B. Mercier, Experience '85 student.

Two programs were proposed and supervised by office staff under the auspices of the Canada Works-Section 38 and Ontario Resource Sector Program. Seven men were hired over a three-month period to clear township boundary lines, mine roads, and two sites for a mining and tourism project. The two tourist sites were also landscaped by fencing of mine stopes, building of viewing platforms, parking lots, trails, and picnic tables.

The compilation and publication of Geological Data Inventory Folios (GDIFs) was continued during the year. Fourteen folios were completed and published in 1985, and three are currently in press. In the past two and one half years, GDIF's for a total of 47 townships have been published, representing 58% of the Cobalt Resident Geologist's area. The remainder of the area should be completed by the Spring of 1987.

Technical assistance and consultative services were provided to prospectors, industry representatives, geologists, government, and the general public as a means of encouraging and facilitating effective exploration and development in the area. Numerous field trips were conducted for university, industry, and government representatives. These trips are important in introducing new companies to the exploration potential of the area and in educating those not familiar with the local geology. In addition, lectures were presented at local schools at varying levels by the office staff and a field trip and lecture presented to the Ministry of Natural Resources Junior Ranger camps in the Temagami District.

A number of potentially hazardous areas near Cobalt were inspected with representatives of the Ministries of Labour and Natural Resources, and recommendations for remedial action presented.

The Resident Geologist continued a regional and structural study of Archean basement rocks and their mineral potential in the area extending from Temagami north to New Liskeard. Detailed mapping and sampling of a volcanic inlier situated in Banting Township (Owsiacki 1984) was extended to the east into Best Township.

In Butler Township, a minor new gold occurrence was discovered on claims held by Kyanite Mining Corporation during a recent property visit of kyanite showings in the Grenville. A sulphide-stained outcrop was observed and sampled, and returned a value of 0.41 gram of gold per tonne. The unit extends over a wide area and is comprised of a pyritiferous (3% to 10%), schistose, grey, altered quartzite. The gold is apparently not associated with any veining. Subsequent grab samples from a few widely separate locations provided minor but still anomalous values of 0.07 gram of gold per tonne and 0.21 gram of gold per tonne. The unit is interbanded with coarse-grained kyanite-garnet gneiss, appears uniformly mineralized with pyrite and extends over a large area. It was additionally noted that pyrite concentrates in narrow to massive lenticular pods in surface outcrop and both copper and silver values were previously noted in drill core. Because of these factors, the few grab samples with their anomalous gold values are believed to be significant. No other similar mineral occurrences have been recognized within 100 km of this area.

Use of the facilities and services provided by the Resident Geologist's Office remained at a fairly high level in 1985, but will probably decline moderately in 1986 with declining exploration. Additional programs being carried out by office staff include the following:

ECONOMIC EVALUATION OF THE LAKE TEMISKAMING PALEOZOIC OUTLIER by W.T. Grant

A project was recently initiated through this office to evaluate an extensive area of Paleozoic cover, from an economic perspective, in order to assess its mineral potential. The outlier is exposed near its southern boundary at Haileybury, trends northwest to Englehart, and occupies part of the Province of Quebec, east and south of Lake Temiskaming. Its maximum width in Ontario is approximately 14 km but only a limited portion is exposed through the thick deposits of glacial clay which overlie most of the region.

Initially, the project involved grab sampling and surface sampling of outcrops (using a J.K.S. Packsack® drill). In those areas drilled, a maximum of 3 m of core was recovered. Samples are now being analyzed for major and trace element content to establish a data base which will be used to identify those areas with the highest industrial mineral potential. Diamond drilling will be undertaken in the Spring of 1986 to establish thicknesses of formations and geochemical continuity within and along specific horizons. Additional parameters to be investigated include the suitability of the material for aggregate, concrete, and ashphalt uses and depth to bedrock, in order to define only those areas amenable to quarrying.

Limestone and dolostone from this region have potential uses as agricultural fertilizer, flux in metallurgical processes, environmental control, building stone, and as filler in paints, plastics, paper, etc.

MINING AND TOURISM PROJECT by E.M. Dodd

A self-guided tour of various historical mine locations in the Cobalt silver camp has recently been initiated by this office and funded by SPARC (Special Projects Assisting Resource Communities). Thirteen historically significant sites have been selected as potential stops on the tour. Two of these sites are currently under development and nearing completion. Each site will be identified in a brochure and accompanying map and will have a viewing and rest stop area, in addition to point-of-interest signs designating historical and geological features. Large highway billboards and numerous directional signs will assist in promotion of the tour. The tour will be partially operational in 1986 and, with continuous work planned for the coming summer, should be completed by the Summer of 1987. It is hoped that it will attract visitors to the region, thereby increasing area tourism and bolstering the local economy.

TAILINGS INVENTORY PROJECT by P. Anderson

A survey of all mill tailings in the Cobalt camp was carried out over the past year. The research included an extensive literature search investigating the historical uses of each mill and the extraction methods utilized, annual report statistics, company reports, and interviews with former mill planners, managers, and workers. Individual tailings sites were studied and described in detail. Surficial mapping was carried out at each site at a 1:2000 scale to define accurate tailings boundaries and surface features which might affect future mining and milling. Some previously mined tailings, including the Cobalt Lake and the Chambers-Ferland sites, are highlighted. The use of some tailings areas as building sites, recreational sites and for re-vegetation experiments are also reported. The report and maps have been completed and will be published by the Summer of 1986.

CORE LIBRARY by P. Anderson

In July, 1985, a building was leased in North Cobalt to replace the previous Cobalt Resident Geologist's Core Library, which was destroyed by fire in March, 1984. The building has been upgraded and includes a field office. Three sets of core racks were built, and 6506.7 m of core (73 drillholes) from 13 companies have been donated to the library and stored. A further 5000 m of core have been promised but not yet collected. A catalogue, produced with computer data processing, is currently being developed and will be available in the Spring of 1986. The building can house approximately 25 000 m of core and additional racks will be constructed in 1986.

MINING ACTIVITY

Despite a continuing decline in silver prices, suspension of three small mining operations active in 1984, and a significant reduction in Agnico-Eagle's area work force, silver production from the camp decreased only marginally from last year. This was due primarily to milling of stockpiled ore and increased grade and production of ore mined at the Castle Mine in Gowganda.

Production at Sulpetro Minerals Limited's tailings mine was not renewed as planned in 1985 because of lower silver prices. At the Silver Queen Mine, operated by Starlight Energy Corporation, mining ceased in the Fall of 1984. No recent activity has been noted at this site and milling of stockpiled "ore" has not been carried out. In Gowganda, a small silver mine operated by Manridge Explorations also ceased production in 1984, due to depletion of ore and low silver prices.

Mining and exploration at the King Edward Mine by Agnico-Eagle Mines Limited and Silver Century Explorations Limited was terminated at the year end because of the lack of any new discoveries.

The development of the Silverside Resources Incorporated silver property in Lorrain Township continued throughout the year. A decline ramp was extended for a distance of 665 m and should reach the inferred ore vein systems in the near future. Underground exploration drilling was started during the fall to test for possible vein extensions of surface defined veins.

Quarrying by Dymond Clay Products Limited continued on a seasonal basis from May to December. Production of metallurgical limestone should reach full capacity in 1986.

Although the parent, Dofasco Incorporated, continued to operate with significant profits in 1985, the Sherman Iron Mine was closed for the fourth consecutive year for a five-week period. Production, as a result, was maintained at 1984 levels.

Only one area mill operated in 1985. Agnico-Eagle's Penn Mill continued throughout the year with all feed originating from local mines owned and operated by the company. The mill is, however, scheduled to be shut down for a four-month period beginning in December, 1985. Although no major improvements were made to the mill during the year, an addition of four cells to the floatation circuit and accompanying modifications to other segments of the mill has been proposed for 1986.

The Agnico-Eagle Mines Limited refinery operated on a continuous basis throughout the year. Modifications are currently in progress at the site and include construction of a new building to house a slag regrind mill and an arsenic distillation furnace. In addition, an oxygen injection system has been proposed for the cyanide leach circuit to increase extraction efficiency and decrease reagent costs. The refinery will be shut down for an approximate four-month period beginning in December, 1985.

Caral Minor Metals Limited, a new company formed to develop a custom roasting facility at the Cobalt Refinery site in 1984, ran into unexpected problems in 1985. As a result little, if any, work was carried out at the plant and it appears to have ceased operations entirely. A film ash operation, also located on the Cobalt Refinery site, discontinued operations in 1985.

Mineral commodities mined and paid for during the year decreased marginally from levels reached in 1984. Approximately 1 650 000 ounces of silver were produced from four area mines, representing a 5% decline from the 1 735 359 ounces produced in 1984. Iron pellet production was maintained at the 1984 level of 1 018 297 tonnes. Significant production gains were made, however, in industrial minerals. Metallurgical limestone production increased by 237% to 6000 tonnes and agricultural grade limestone production by 730% to 2000 tonnes from the previous year. Quarrying of decorative building stone increased by 94% to 258 tonnes. In addition, substantial quantities of sand and gravel were extracted. Cobalt, copper, and nickel were mined together with silver but not recovered.

KING EDWARD MINE (SILVER CENTURY EXPLORATIONS LIMITED AND AGNICO-EAGLE MINES LIMITED)

This mine was de-watered in 1980 and has been extensively explored since this time. Although a number of new veins were discovered, only the #268 resulted in any production. Ore originated primarily as drift and raise muck within a shoot of very limited extent. Total production from the mine comprised 411 tons grading approximately 20 ounces of silver per ton. This material is presently stockpiled on surface at the mine site. Mining and exploration were confined primarily to the bottom (1065-foot) level of the mine workings. Underground exploration diamond drilling during the year totaled 3831 m, representing a drop of 49% from the previous year.

Veins are located beneath the lower contact of a Nipissing diabase sill, and cut Archean mafic volcanic flows. The limited ore produced originated from that part of the vein immediately beneath the lower diabase contact.

Despite the presence of three other veins with remaining minor silver reserves, the company decided to abandon further mining and exploration at this site, for the present. Pumps were pulled in November and the mine was allowed to flood.

LANGIS MINE (AGNICO-EAGLE MINES LIMITED)

Although a new "orebody" was discovered in the Fall of 1983, subsequent development has been delayed due to depressed silver prices. Production activities at the mine were suspended in mid-March of this year for this reason. Tentative plans have been made to restart mining operations in the Spring of 1986.

In the first quarter of operations, mining was restricted to three veins. The #35-103, developed from the fifth level of the #3 shaft, was mined-out and produced 130 tons of ore grading 7.7 ounces of silver per ton of a total 1671 tons mined during the life of the vein. This represents 4% of the Langis Mine 1985 production. On the same level, 600 tons of ore, grading 11.8 ounces of silver per ton, were removed from the #35-107 vein (19% of this year's production). Seventy-seven percent of silver produced originated as development muck from the new discovery vein, #64-110, accessed from the fourth level of the #6 shaft workings. Twenty-four hundred tons of ore, grading 5.5 ounces of silver per ton, were mined in the first three months of the year from this vein. The latter two veins still contain ore and will be mined in the future.

Drifting and cross-cutting activities were limited to approximately 94 m of development on the sixth level of the #6 shaft, to access the #64-110 vein.

With the suspension of mining in March, the work force was reduced and the mine returned to an exploration only basis. Underground exploration diamond drilling declined by 30% from the year earlier period to 6963 m.

All ore shoots occur within steeply dipping carbonate veins which cross-cut Huronian-age pebbly wackes. These sediments represent a thin remnant of Huronian rocks sandwiched between underlying Archean mafic volcanic rocks and the overlying base of a Nipissing diabase sill. The style of veining in the new #64-110 vein is characteristically developed in the thinly-laminated argillites, typical of the Coleman Member sediments elsewhere in the camp. Rather than a single vein, numerous, short, parallel and discontinuous veinlets and accompanying random fractures, coated with native leaf and plate silver are dominant. Mineralization is slightly different, in that argentite comprises approximately 30% of the ore and native silver the remainder. The advantage to this style of veining is the possible development of very wide, good grade stopes.

BEAVER-TEMISKAMING MINE (AGNICO-EAGLE MINES LIMITED)

Silver mining, exploration, and development continued throughout the year, although activities drastically declined as of April, 1985. At this time, the mine work force was reduced by 40% to 50%.

Mining during the year was restricted to three primary vein systems. Fifty percent of the ore was obtained from the #37 vein, above the 1330-foot level. Thirty-five percent originated from the #41 vein, and fifteen percent from the #44 vein; again both from above the 1330-foot level. In all, 22 188 tons of ore were mined with an average grade of 11.8 ounces of silver per ton. All ore was hoisted via the Temiskaming shaft. The Beaver shaft is now primarily used for ventilation.

Underground exploration diamond drilling reflected the general downturn in activity and declined 17% to 7097 m. The bulk of exploration was carried out in the northwestern mine workings (Brady Lake area) from the 1600-foot level. Drilling in this area last year encountered one good ore grade intersection. As a result, a crosscut was driven to this location and subsequent drifting along new veins carried out. Drilling in this vicinity in 1985 was encouraging enough to warrant development of an incline from the 1600-foot level to the 1445-foot elevation, where approximately 24 m of drifting were completed. A total of 134 m of drifting and crosscutting were carried out during the year in this part of the mine workings.

As a result of declining reserves and lower silver prices, the mine will concentrate on development and exploration in 1986. Mining will continue at a much reduced level.

All stopes have been developed in veins cutting Archean mafic volcanic flows below a significant, step-like structure formed at the lower contact of a Nipissing diabase sill (Robinson 1984). The new area of exploration (Brady Lake) differs in that veins occur closely related to a wide band of black, cherty interflow sediment.

SHERMAN MINE (DOFASCO INCORPORATED AND TETAPAGA MINING COMPANY LIMITED)

For the fourth consecutive year, this relatively low grade iron mine was shut down for a 5-week period in 1985. As a result, iron pellets produced remained at a level of approximately 1 018 297 tonnes, recovered from 3.98 million tonnes of crude ore. In addition to the slowdown, the work force was reduced during the year by 10%.

Although production remained relatively constant, mining of waste declined by 44% to 2.84 million tonnes. Three pits were utilized during the year. Sixty percent of the ore was mined from the East Pit. This pit is characterized by an elongate shape and has been developed to the third bench. The first bench was completed in 1985 to the eastern boundary and the second bench extended three quarters of the way across the pit. Thirty percent of the ore was mined from the central portion of the West Pit and ten percent from the South Pit. Mining of the latter pit is more or less a scavenging operation, with remaining ore in the pit removed by backhoe. The new Turtle Lake Deposit is currently being stripped and initial mining projected to begin in mid-1987.

EXPLORATION ACTIVITY

Despite a poor year for mining companies in general and considerably depressed commodity prices, exploration in this area maintained the relatively high levels reached in 1984. Although underground exploration diamond drilling decreased by 24% from the previous year to 18 833 m, surface drilling increased by 46% to 10 915 m. Combined drilling decreased only 8% from 1984 (Figure 8.2). This decline can be directly related to the mid-year slowdown instituted by Agnico-Eagle Mines Limited. Claim staking activity remained at a relatively static modest level, as it has since the enforcement of the Bear Island Indian Caution in 1978.

Emphasis was once again on precious metals exploration and although silver was, as expected, the most sought after mineral, gold exploration, particularly in the Temagami area, showed a marked increase from previous years. Exploration for limestone and dolostone began in earnest when local iron mines indicated that they may require up to 200 000 tonnes/year of this material for use in a proposed new pellet fluxing plant at the mine sites.

The most significant discovery of the year was made during the fall by two weekend prospectors from Wisconsin. Using a metal detector to search for silver float in the general Cobalt camp area, the two men discovered a surface exposure of a new high grade, silver vein in upper contact Nipissing diabase.

Major exploration and development undertaken during the year is summarized below and in Table 8.2.

T.T.L. Minerals Limited concluded a detailed mapping and sampling program at the underground workings of the old North Cobalt Shaft (Owsiacki 1985a) in Bucke Township. Records describing these workings were previously very incomplete and have been extensively updated as a result of this project. The mine produced a small amount of silver in 1909

(Thomson 1960). Four levels were mapped and a winze on the bottom level, 135 feet below the collar, identified. Two distinct, relatively parallel vein structures were recognized, along with numerous, weaker, subsidiary structures. The "shaft vein", where silver was originally mined via a short raise to surface is a typical dilatant vein (Owsiacki and Lovell 1984). Silver is developed in an erratic shoot within a vein cutting Coleman Member quartzite and pebbly wacke, immediately above the Archean unconformity. The basement rocks are comprised here of sulphide-rich, interflow cherts, quartz-eye rhyolite (?) and a feldspar-quartz porphyry intrusion. A shallow, northeast dipping fault occurs along this unconformity and contains silver where it intersects the vertical ore vein. Subsequent sampling of the vein in this area provided numerous good grade values over narrow widths.

The second, parallel structure, located approximately 15 m north of the "shaft vein" and representative of a shear vein (Owsiacki and Lovell 1984) is exposed on the bottom two levels within Archean mafic volcanic flows. Sporadic erythrite was visible along its length and sampling of the vein revealed relatively low quantities of silver (0.1 to 1.0 ounces of silver per ton over 0.5 m).

Four short holes were drilled near the shaft in the summer to test for a possible extension of the north shear vein up into the Huronian sediments and possible strike extension of the "shaft vein". The structures were intersected but returned only minor silver values.

Two additional holes were drilled in the eastern limits of the claim group to test a VLF conductor identified in 1984. No significant mineralization was encountered during this drilling.

Problems with the surface rights holder of part of the claim group resulted in termination of work following the drill program.

Osisko Lake Mines Limited acquired a four-claim group in Lorrain Township and carried out a comprehensive exploration program for silver on this ground. The claims are centred over the inferred extension of the McKenzie Fault which abuts against the new Silverside Resources Incorporated silver discovery, located approximately 2 km to the northwest. Much of the claim group is covered with overburden and is underlain primarily by conglomerates of the Coleman Member of the Gowganda Formation. These rocks overlie the upper contact of a Nipissing diabase sill.

The first phase of the program included extensive line-cutting, followed by a geological survey including surface outcrop sampling, soil and stream geochemistry, and a VLF survey. Anomalous areas were subsequently drilled with seven holes but no significant mineralization was encountered.

G.Q.R. Resources Limited hold a ten-claim property in Lorrain Township. The claims are underlain by upper contact Nipissing diabase and include a 200-foot deep shaft put down in the past on a known silver occurrence. Two holes were drilled to test the downward extension of this vein. The drillholes intersected a number of narrow carbonate veins carrying moderate amounts of chalcopyrite but no significant silver or arsenide mineralization.

Silver Century Explorations Limited acquired four claims in Coleman Township from Bursary Silver Mines Limited. Two weekend prospectors earlier discovered a new high grade occurrence of silver with a metal detector on this ground. The vein is exposed for a length of 15 m in upper contact Nipissing diabase. A sample from the outcrop revealed a 3 cm wide vein of etched white calcite carrying approximately 50% massive silver and very little arsenide material. The company has since brought in a drill and completed 12 shallow holes in the immediate vicinity of the find.

Phaeton Exploration Limited continued drilling an area including the eastern extension of veins previously mined for silver at the rich Cross Lake-O'Brien Mine in Coleman Township. Three deep drillholes were completed to test the Huronian sequence below the lower contact of a Nipissing diabase sill. A number of narrow carbonate and quartz veins were intersected but contained only minor magnetite and base metal sulphide minerals.

Stroud Resources Limited acquired the old Penrose Mine property in Strathy Township (Bennett 1978) early in the year and subsequently purchased an adjoining claim prospected last year by H. Neimetz (Owsiacki 1985a). The property hosts a number of well mineralized veins and shear zones characterized by the presence of erratic but good gold values. Lacana Mining Corporation has since entered into an option agreement which may eventually earn it a 70% interest in the property. During the Fall of 1985, this company carried out an extensive stripping and sampling program and plans follow-up drilling for the winter. Initial metallurgical tests of dump material have been completed.

Silverside Resources Incorporated maintained an active presence in the Cobalt area. The company optioned a group of claims from B. Ferguson earlier in the year in Lundy Township. The claims were staked on the basis of a silver/copper occurrence identified from recent mapping (Owsiacki 1985b). Eight diamond-drill holes were put down in the area, the second of which intersected a cobalt arsenide vein with significant silver values.

The claims are underlain by the basal portion of a Nipissing diabase sill which dips shallowly to the west. The intersected vein appears to be a downward extension of the surface occurrence and cuts thinly-laminated maroon argillites of the Firstbrook Member of the Gowganda Formation. Silver was identified visually within the core, 85 m below the sill. This may be the first known occurrence of silver within veins cutting this sedimentary horizon. Following this discovery, the company staked an additional 42 claims in the area.

Silver Lake Resources Incorporated, in conjunction with Silverside Resources Incorporated, continued exploration and development in the vicinity of an earlier silver discovery (Owsiacki 1984a) made in Lorrain Township. A decline was collared early in 1985 and advanced 665 m of a total proposed 823 m. Three drill stations have been cut and underground exploration drilling is currently in progress. Surface exploration continued on this property with acquisition of a single claim in Bucke Township, adjacent to and north of the decline. In addition, a grid was cut over the southern limits of the property and followed with a VLF survey and 3353 m of diamond drilling.

Proteus Resources Incorporated hold a large group of claims adjacent to the south and east of the Silverside/Silver Lake ground in Lorrain Township. Drilling of 2229 m in eleven holes was completed in the vicinity of an old, previously recorded intersection.

Agnico-Eagle Mines Limited continued a surface exploration program around the Langis Mine in Harris Township. Surveys conducted in 1984 have subsequently been followed-up with a twelve-hole diamond-drill program. A few minor intersections were encountered and may be further investigated in the future. Additional line-cutting and VLF and magnetometer surveys were carried out in isolated parts of the property. The company also recently acquired an option on a five-claim group located adjacent to the Silverside Resources Incorporated discovery claims in Lorrain Township. A decline, previously put down by Teledyne Limited on these claims, has been pumped and an underground exploration drilling program is planned for the near future.

Canadaka Mining Corporation was established during the year and has an option to acquire all of Sulpetro Minerals Limited's area mines, mill, and properties. Underground workings have recently been de-watered and an exploration program, using the Conisil shaft for access is scheduled to begin by year-end.

K. Morgan acquired claims in Lundy Township and completed mapping and VLF surveys. Copper and minor silver and cobalt values were obtained from altered wallrock near intrusive Nipissing diabase dikes and plugs. Host rocks are primarily lower Lorrain Formation quartzites. These rocks have been baked red near the intrusions and contain disseminated and clotty chalcopyrite, azurite, malachite, and specular hematite (Owsiacki 1985b).

M. Shepherdson and R. Butler discovered a new cobalt showing in Dymond Township. Erythrite was observed coating a number of parallel fractures in Nipissing diabase. The men have since undertaken some overburden trenching and found it to be of little value because of the irregularity of the bedrock surface below a clay cover. The work has recently concentrated on exposing the fractures with trenching of the outcrop showings.

Exploration for gold in the Temagami greenstone belt increased markedly in 1985. Two companies, Inco Limited and Lacana Mining Corporation, executed extensive line-cutting programs on patented claims in the vicinity of Net Lake in Strathy Township. Geological and geophysical surveys were carried out and extensive stripping and trenching undertaken on the Lacana ground. Drill programs have been proposed to start in the near future in this area.

Numerous other companies were active in the area and include Temco Mines Limited, Kyanite Mining Corporation, Pronto Explorations Limited, Nortario Limestone Limited, Bigstone Minerals Limited, Danra Resources Limited, Teck Corporation, Outcrop Explorations Limited, Hudson Bay Mining and Smelting Company Limited, Stroud Resources Limited, BP Canada Incorporated, Exploration Aiguebelle Incorporated, Profenix Enterprises Limited, Golden Associates, Falconbridge Limited, Addson Resources Limited, Temrex, Knox-Martin-Kretch Limited, Sulpetro Minerals Limited, and Boston Creek Mines Limited.

Prospecting activity remained at a fairly high level despite the negative effects of a Land Caution filed in the past by the Temagami Indian Band. A more complete summary of exploration activity in the Cobalt Resident Geologist Area in 1985 is provided in Table 8.2 and Figures 8.1a and 8.1b.

Data submitted for assessment purposes or donated are summarized in Table 8.3 and relevant Ontario Geological Survey and Geological Survey of Canada publications are listed in Table 8.1.

INDUSTRIAL MINERALS

LIMESTONE/DOLOSTONE

In the past two years, there has been a dramatic rise in both development and exploration for limestone and dolostone in this area. Much of the recent interest can be attributed to the decision by Dofasco Incorporated to develop an on-site iron flux pelletizing process at the Sherman and Adams Mines. This pelletizing process is designed to use a flux composed of a limestone-dolostone blend which, at present, is shipped by rail from Southern Ontario. In order to make the process more economical, a local source of flux is desirable.

It has become apparent that the Paleozoic outlier in this region hosts a variety of potentially exploitable rock types ranging from low silica, high magnesia dolostone to low silica, high calcium limestone. Many companies, including Dymond Clay Products Limited, Nortario Limestone Limited, Exploration Aiguebelle Incorporated, and Sherman Mine, have expressed interest in locating and developing properties in the area. At present, several of these companies are operating quarries within the Paleozoic Outlier. Dymond Clay Products Limited quarries high calcium, low silica limestone for metallurgical and agricultural markets. Nortario Limestone Limited operates a quarry near Earlton and produces crushed stone for aggregate, in addition to high magnesia, low silica dolostone used in metallurgical processes. Two other minor quarries are located in the Outlier but operate only intermittently. One produces flagstone and the other is operated by the Township of Harley to provide rock fill for township projects. A quarry operated by Exploration Aiguebelle Incorporated in Quebec, located on the eastern shore of Lake Temiskaming, produces dolostone for agricultural uses. Increased demand for these products in an expanding local market and the recent successes of local operators will undoubtedly result in further exploration and development in the coming years.

Dymond Clay Products Limited remains the only limestone producer within the Cobalt Resident Geologist's area. Shipment of their product during the Spring of 1985 was restricted because of a lack of drying facilities. To meet this requirement, a large

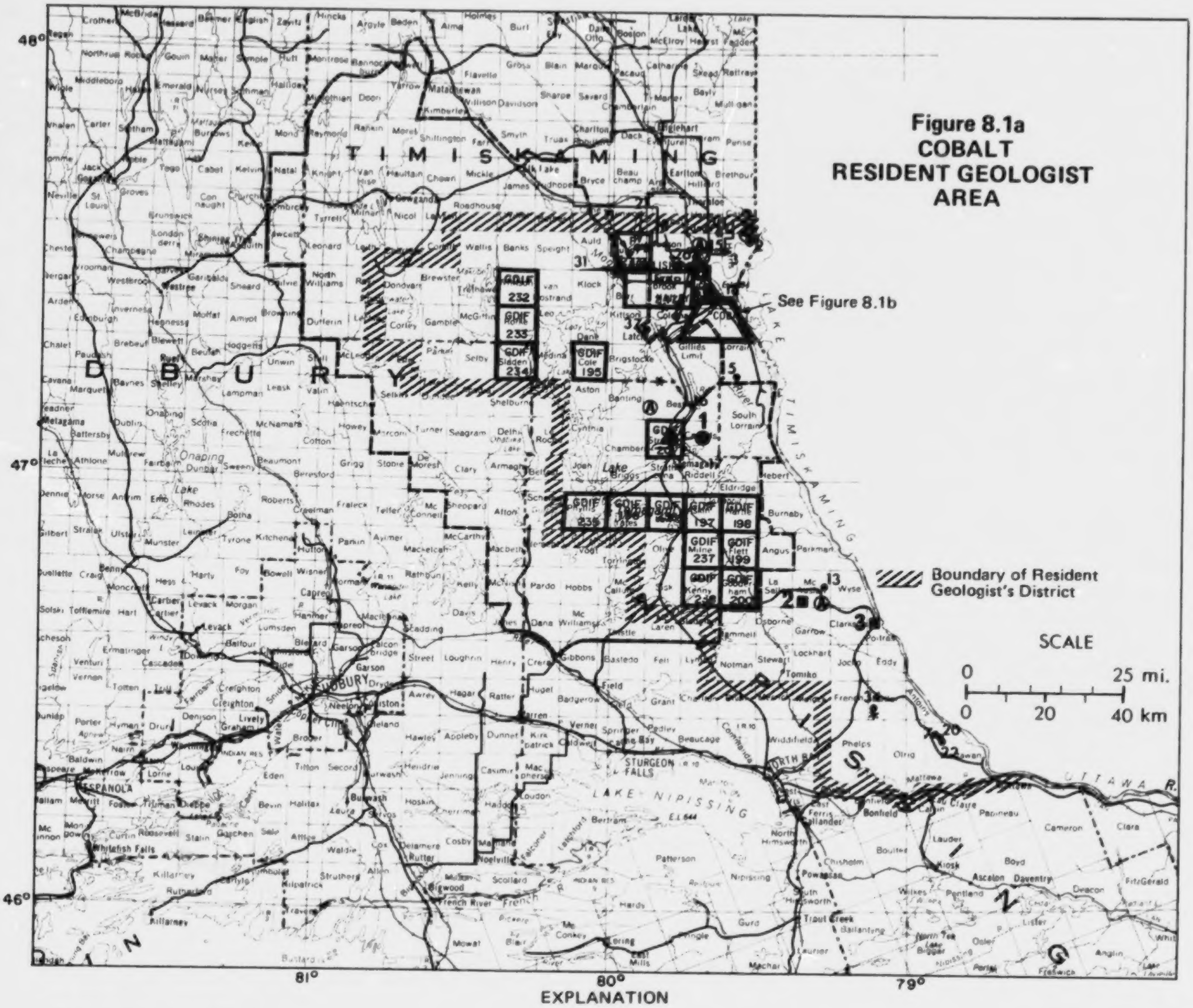


Figure 8.1a
COBALT
RESIDENT GEOLOGIST
AREA

See Figure 8.1b
Boundary of Resident Geologist's District
SCALE
0
25 mi.
0
20
40 km
T I M I S K A M I N G
S U D B U R Y
N I P I S S I N G
TIMISKAMING
LAKE NIPISSING
OTTAWA R.
SUDBURY
STURGEON FALLS
ESPANOLA
NORTH BAY
GDIF 232
GDIF 233
GDIF 234
GDIF 195
GDIF 235
GDIF 196
GDIF 197
GDIF 198
GDIF 237
GDIF 199
GDIF 200
1
2
3
5
13
31
48°
47°
46°
81°
80°
79°

EXPLANATION

● Producing Mines, 1985
1. Sherman Mine (Dofasco, Tetapaga Mining Co. Ltd.) . . . . Fe
2. Beaver-Temiskaming Mine (Agnico-Eagle Mines Ltd.) . . . Ag

◑ Mines Under Development, 1985
1. Silverside Resources/Silver Lake Resources Inc. . . . . Ag

◒ Mines Producing in 1985 and Subsequently Closed
1. King Edward Mine (Silver Century Explorations Limited and Agnico-Eagle Mines Ltd.) . . . . Ag
2. Langis Mine (Agnico-Eagle Mines Ltd.) . . . . Ag

⊕ Mines Currently Maintained on Stand-By Basis
1. Conisil (Canadaka Mining Corp.) . . . . Ag
2. University (Canadaka Mining Corp.) . . . . .Ag
3. Cleopatra (Canadaka Mining Corp.) . . . . Ag

■ Producing Quarries
1. Dymond Clay Products Ltd. . . . . Limestone
2. McLaren's Bay Mica Stone Quarries . . . . Stone
3. P. Pharand Quarry . . . . Stone

• Exploration and claim staking activity in 1985 (Keyed to TABLE 8.2)

* Assessment Work Filed in 1985 (Keyed to TABLE 8.3)

◬ Operating Refineries
1. Agnico-Eagle Refinery

ⓣ Operating Mills
1. Agnico-Eagle Mines Ltd., Penn Mill

Ⓐ Location of Resident Geologist's Field Mapping Parties in 1985

— Map or Report issued by the Ontario Geological Survey in 1985

--- Areas withdrawn from staking through Bear Island Indian Caution

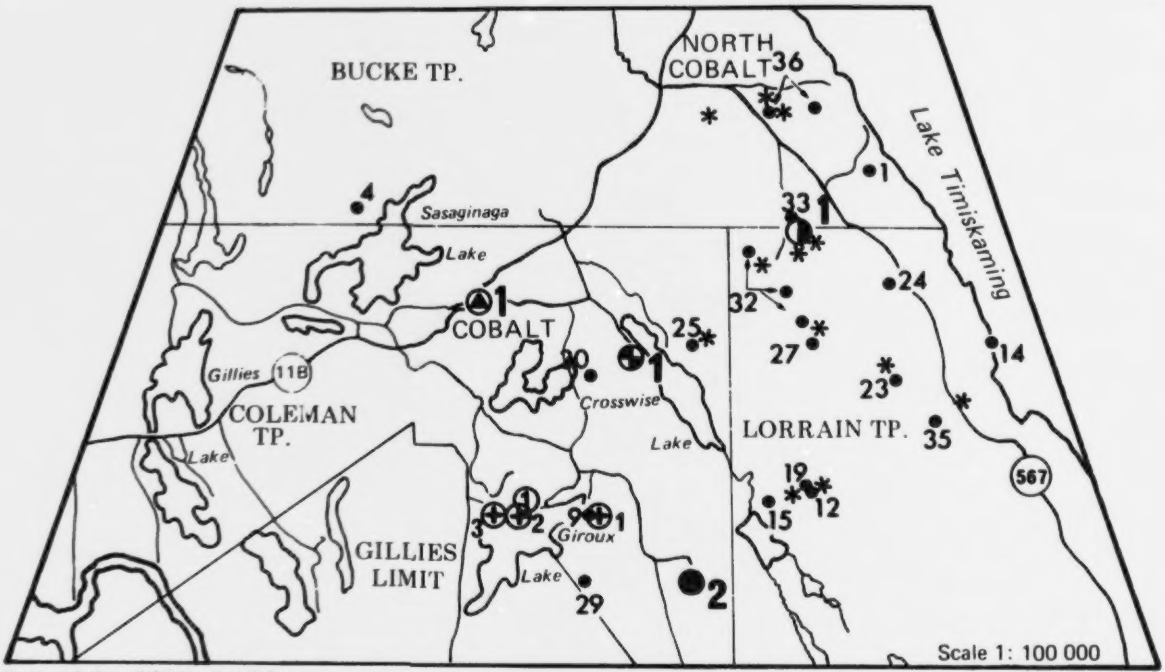


Figure 8.1b . COBALT AREA

storage shed, capable of housing 6000 tonnes of crushed material, was completed in July. Regular shipments of metallurgical limestone to Kidd Creek Mines Limited started in June and will now continue year-round with daily deliveries. The pit was extended in November to the north and new material crushed for winter storage. Production of the more valuable metallurgical limestone increased in 1985 to approximately 6000 tonnes from 1780 tonnes in 1984. Seventy percent of this material was shipped to the Kidd Creek Mines smelter in Timmins and 30% to the Noranda Mines smelter in Noranda. Agricultural limestone shipments increased to 2000 tonnes from 241 tonnes and limestone aggregate to 2500 tonnes from 703 tonnes. Full production should be reached in 1986.

BUILDING STONE

Quarrying of decorative building stone was carried out in three townships in the North Bay area. The largest producing quarry is located on Reynolds Lake in McAuslan Township. Approximately 258 tonnes of two major types of stone were removed by the operator, McClaren's Bay Mica Stone Quarries. The stone is comprised of both red and green micaceous quartzose gneisses, cut by abundant quartz veining. Two minor and intermittent producing quarries are located in Poitras Township and a third in Jocko Township.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

GEOPHYSICS/GEOCHEMISTRY SECTION

A geophysical study of the Cobalt Embayment was initiated in 1980. Some results from this work remain to be interpreted (Gupta 1985).

RESEARCH BY OTHER ORGANIZATIONS

CARLETON UNIVERSITY

G. Burbidge continued regional field studies investigating the sedimentology of the Gowganda Formation as part of a Ph.D. thesis. The Coleman Member, in particular, was studied in the Temagami area this past summer.

M. Smyk began research, as part of an M.Sc. thesis, on the sulphide mineralogy of Archean interflow sediments and its relationship to silver-bearing carbonate veins in Cobalt.

P. McRobbie is completing detailed mapping of a small area of the Archean basement on Nipissing hill in Cobalt as part of a B.Sc. thesis project.

UNIVERSITY OF TORONTO

D. Conrod continued field investigations of Nipissing diabase in the Cobalt area as part of an M.Sc. thesis. Petrology, geochemistry, and isotopic studies of these and similar intrusions near Sudbury are being compared and platinum group element potential established.

McMASTER UNIVERSITY

R.J. Bowins carried out analytical determinations of rare earth element contents in the Sherman and Adams Mines iron formation deposits (Crocket and Bowins 1985) as part of a Ph.D. thesis.

TABLE 8.1 MAPS AND REPORTS PERTAINING TO THE COBALT RESIDENT GEOLOGIST AREA PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Geological Data Inventory Folios

GDIF 195
GDIF 196
GDIF 197
GDIF 198
GDIF 199
GDIF 200
GDIF 201
GDIF 232
GDIF 233
GDIF 234
GDIF 235
GDIF 236
GDIF 237
GDIF 238

Coloured Map

Map 2474

Miscellaneous Reports

MP 125
MP 126
MP 127

Geological Survey of Canada Open File Report

GSC OFR 1154

Preliminary Map-Geological Series

P.2733

Ontario Geological Survey Report

Report 237

Mineral Resource Branch Publication

MPBP 20

RECENT PUBLICATIONS AND REFERENCES

Bennett, G.
1978: Geology of the Northeast Temagami Area, District of Nipissing; Ontario Geological Survey, Report 163, 128p. Accompanied by Maps 2323 and 2324, scale 1:31 680 or 1 inch to 1/2 mile and 1 chart.

Conrod, D.M. and Naldrett, A.J.
1985: Petrology, Geochemistry, Isotopic Studies and Platinum Group Element Potential of the Nipissing Diabase: Grant 230, p.206-222 *in* Geoscience Research Grant Program, Summary of Research, 1984-1985, edited by V.G. Milne, Ontario Geological Survey Miscellaneous Paper 127, 246p.

Crocket, J.H., and Bowins, R.J.
1985: Rare Earth Element Properties of Archean Iron Formations and their Host Rocks—Some Results from the Temagami and Boston Iron Formations; Grant 132, p.10-14 *in* Geoscience Research Grant Program, Summary of Research 1984-1985, edited by V.G. Milne, Ontario Geological Survey, Miscellaneous Paper 127, 246p.

Dodd, E.M.
1985: The Origin of a Unique Sandstone Bedset in the Upper Gowganda Formation near Haileybury, Ontario, Unpublished B.Sc. Thesis, Carleton University, Ottawa, Ontario.

Donaldson, J.A., Michel, F.A., Mustard, P.S., Rainbird, R., Rust, B.R., Watkinson, D.H., and Wilson, B.
1985: Sedimentary Rocks and Strata-Bound Mineralization in the Cobalt Region; Grant No. 173, p.87-100 *in* Geoscience Research Grant Program, Summary of Research, 1984-1985, edited by V.G. Milne, Ontario Geological Survey Miscellaneous Paper 127, 246p.

Gebert, J.
1985: Archean Proterozoic Unconformity and Sulphides, Cobalt, Ontario, Unpublished B.Sc. Thesis, Carleton University, Ottawa, Ontario.

Gupta, V.K.
1985: Cobalt Embayment Interpretation: Depth to Basement and Distribution of Nipissing Diabase from Aeromagnetics; p.178-181 *in* Summary of Field Work and Other Activities, 1985, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey Miscellaneous Paper 126, 351p.

Johns, G.W.
1985: Geology of the Firstbrook and Parts of Surrounding Townships Area, District of Timiskaming; Ontario Geological Survey, Report 237, 58p. Accompanied by Map 2474, scale 1:31 680 or 1 inch to 1/2 mile.

Johns, G.W. and Van Steenburgh, R.
1984: Firstbrook and Parts of Surrounding Townships; Ontario Geological Survey, Map 2474, Precambrian Geology Series, scale 1:31 680 or 1 inch to 1/2 mile. Geology 1979.

Long, D.G.F. and Colvine, A.C.
1985: Geology and Placer Related Gold Potential of the Huronian Supergroup in Part of the Northwestern Cobalt Plain; p.242-247 *in* Summary of Field Work and Other Activities, 1985, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey Miscellaneous Paper 126, 351p.

MacQeen, J.K.
1985: Sulphide Mineralogy and Chemistry in Archean Rocks near Silver Vein, Cobalt, Ontario; Unpublished B.Sc. Thesis, Carleton University, Ottawa, Ontario.

Mustard, P.S.
1985: Sedimentology of the Lower Gowganda Formation, Coleman Member, (Early Proterozoic) at Cobalt, Ontario, Unpublished M.Sc. Thesis, Carleton University, Ottawa, Ontario.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 8.2

Number on Figure	Individual or Company	Activity
1	Agnico-Eagle Mines Limited	Decline de-watering, Bucke Township
2	Agnico-Eagle Mines Limited	Surface diamond drilling, line-cutting, geophysical surveys, Harris Township
3	Aiguebelle Resources Limited	Regional reconnaissance sampling, Paleozoic Outlier
4	Armstrong, J.E.	Claim staking (4), Bucke Township
5	Baker, A.	Trenching, Lorrain Township
6	Benner, R.	Claim staking (2), Firstbrook Township
7	Brousseau, A.	Claim staking (7), Mattawan Township
8	Butler, R. and Shepherdson, M.	Trenching, sampling, Dymond Township
9	Canadaka Mining Corporation	Shaft de-watering, Coleman Township
10	Dymond Clay Products Limited	Regional reconnaissance sampling, Paleozoic Outlier
11	Ferguson, B.	Prospecting, Lundy Township
12	G.Q.R. Resources Limited	Claim staking (2), trenching, sampling, surface diamond drilling, Lorrain Township
13	Haberer, J.	Claim staking (6), McAuslan Township
14	Hammond, R.B.	Claim staking (2), Lorrain Township
15	Hervieux, G.	Claim staking (4), Lorrain and Bucke Townships
16	International Nickel Company (INCO)	Line-cutting, geophysical surveys, Strathy Township
17	Lacana Mining Corporation	Line-cutting, trenching, stripping, Strathy Township
18	Laforge, M.C.	Claim staking (2), Bucke Township
19	Marshall, W.	Claim staking (1), Lorrain Township
20	McCormack, D.	Claim staking (15), Mattawan Township
21	Morgan, K.	Claim staking (4), geological survey, geophysical survey, sampling, Lundy Township
22	Morin, R.	Claim staking (11), Mattawan Township
23	Osisko Lake Mines Limited	Surface diamond drilling, line-cutting, geophysical survey, geochemical survey, geological survey, Lorrain Township
24	Paquette, D.H.	Claim staking (1), Lorrain Township
25	Phaeton Exploration Limited	Surface diamond drilling, Coleman Township
26	Pollock, J.W.	Claim staking (1), Hudson Township
27	Proteus Resources Incorporated	Line-cutting, surface diamond drilling, Lorrain Township
28	Scott, W.P.	Claim staking (6), Hudson Township
29	Silver Century Explorations Limited	Surface diamond drilling, Coleman Township
30	Silver Century Explorations Limited	Underground diamond drilling, Coleman Township
31	Silverside Resources Incorporated	Claim staking (40), surface diamond drilling, line-cutting, geological survey, Lundy Township
32	Silverside Resources Incorporated	Claim staking (1), surface diamond drilling, Lorrain Township
33	Silverside Resources Incorporated	Decline construction, underground diamond drilling, Bucke Township
34	Snodden, L.D.	Trenching, Butler Township
35	T.T.L. Minerals Limited	Claim staking (4), Lorrain Township
36	T.T.L. Minerals Limited	Surface diamond drilling, geophysical survey, Bucke Township
37	Wright, R.J.	Claim staking (4), Coleman Township

TABLE 83

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

SUDBURY MINING DIVISION

SYMBOLS AND ABBREVIATIONS

Ag-Silver
am-amethyst
Assess-Assessment Work
Au-Gold
BM-Base Metal
D-Donated by Company or Individual
DDS-Surface Diamond Drilling (where shown, the numbers following "DDS" indicate the number of holes drilled and the total length drilled respectively)
Di-diamonds
EM-Electromagnetic Survey
Geochem-Geochemical Survey
GL-Geological Survey
HLEM-Horizontal Loop Electromagnetic Survey
IP-Induced Polarization Survey
Mag-Magnetometer Survey
rTr-Rock Trenching
SA-Sampling, Assays
Tr-Trenching
UG-Underground Work
UGL-Underground Geological Survey
VLF-Very Low Frequency

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Brigstocke & Best Twps.	31M/4, 5	Northwest Canalask Nickel Mines Ltd.		D	Mag, EM	1964		
Bucke Twp.	31M/5	Highland Crow Resources Ltd.	Ag, BM	Assess	DDS 1-607 ft	1984		
Bucke Twp.	31M/5	Monopros Ltd.	Di	Assess	DDS 1-58.8 m, Mag	1984	2.7586	
Bucke Twp.	31M/5	T.T.L. Minerals Ltd.	Ag	Assess	DDS 4-343 ft, UG, Tr, SA	1985		
Bucke Twp.	31M/5	T.T.L. Minerals Ltd.	Ag	D	UGL, SA	1984		
Butler Twp.	31L/6	Snodden, L.	am	Assess	rTr	1985		
Casey Twp.	31M/12	Pronto Explorations Ltd.	Ag	D	DDS 1-269 ft	1985		
Coleman Twp.	31M/5	Phaeton Exploration Ltd.	Ag	D	DDS 3-2261 ft	1984-85		
Dymond & Bucke Twps.	31M/5	St. Joseph Explorations Ltd.	BM	D	HLEM, Mag, IP	1979		
Firstbrook Twp.	31M/5	The Hudson Bay Mines Ltd.	Ag	D	DDS 4-1316 ft	1984		
Harris Twp.	31M/12	Agnico-Eagle Mines Ltd. (Langis Mine)	Ag	D	DDS 3-1252 ft	1985		
Lorrain Twp.	31M/5	Gossan Resources Ltd.	Ag	D	DDS 2-1599 ft	1984		
Lorrain Twp.	31M/5	GQR Resources Ltd.	Ag	Assess	rTr	1985		
Lorrain Twp.	31M/5	GQR Resources Ltd.	Ag	D	DDS 2-410 ft	1985		
Lorrain Twp.	31M/5	Osisko Lake Mines Ltd.	Ag	D	DDS 7-2135 ft, VLF, Geochem, GL, SA	1985		
Lorrain Twp.	31M/5	Proteus Resources Inc.	Ag	D	DDS 11-7548.3 ft	1985		
Lorrain Twp.	31M/5	Silverside Resources Inc.	Ag	D	DDS 8-3523 ft	1983		
Lorrain Twp.	31M/5	Silverside Resources Inc.	Ag	D	DDS 33-14094 ft	1984		
Lorrain Twp.	31M/5	Silverside Resources Inc.	Ag	D	DDS 16-10789 ft	1985		
Lundy Twp.	31M/12	Morgan, K.A.	Ag	Assess	VLF, GL	1985		
Lundy Twp.	31M/12	Silverside Resources Inc.	Ag	Assess	DDS 8-4004 ft, SA	1985		
Lundy Twp.	31M/5	Silverside Resources Inc.	Ag	D	GL	1985		
Strathcona Twp.	31L/13	St. Joseph Explorations Ltd.	Au	D	DDS 7-1205.1 m	1978		
Strathy Twp.	31M/4	Jaye Explorations Ltd.	Au, Bm	D	DDS 4-1333 ft, SA, Mag, EM	1965		

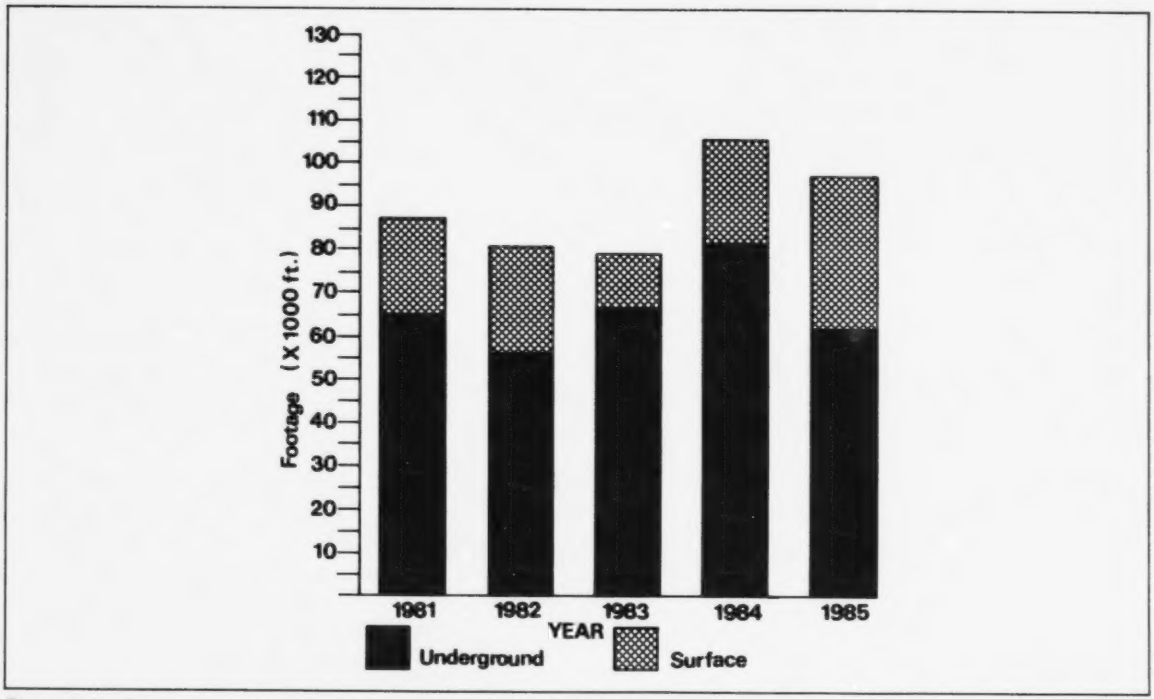


Figure 8.2. Exploration diamond drilling activity in the Cobalt Resident Geologist Area

Owsiacki, L.

1984: Geology of the McLean Lake-Lundy Lake Area, Nipissing District; p.237-241 *in* Summary of Field Work 1984, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 119, 309p.

1985a: Cobalt Resident Geologist Area, Northeastern Region; p.197-208 *in* Report of Activities 1984, Regional and Resident Geologists, edited by C.R. Kustra; Ontario Geological Survey, Miscellaneous Paper 122, 297p.

1985b: Geology and Mineral Deposits of Lundy Township, Timiskaming District; Ontario Geological Survey, Map P.2733, Geological Series-Preliminary Map, scale 1:15 840 or 1 inch to 1/4 mile. Geology 1981, 1982.

Owsiacki, L. and Lovell, H.

1984: Geology, Silver and Gold Deposits: Cobalt and Kirkland Lake; Geological Association of Canada/Mineralogical Association of Canada (GAC/MAC). Joint Annual Meeting, May 14-15, 1984, Field Trip Guide Book 4, 114p.

Robinson, D.

1984: General Geology of the Beaver-Temiskaming Mine, Cobalt, Ontario; *in* Geological Association of Canada Field Trip 4, Geology, Silver, and Gold Deposits: Cobalt and Kirkland Lake by L. Owsiacki and H. Lovell, 114p.

Thomson, R.

1960: Preliminary Report on Bucke Township, District of Timiskaming, Description of Mining Properties: Ontario Department of Mines, 106p.

9. Sault Ste. Marie Resident Geologist Area, Northeastern Region

G. Bennett[1], E.J. Leahy[2], J.P. Donald[3], E. Frey[4], J.J. Kral[5], and D.J.J. Tortosa[5]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

[3]Drill Core Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

[4]District Geologist, Ontario Ministry of Northern Affairs and Mines, Wawa

[5]Contract Geologist, Ontario Ministry of Northern Development and Mines, Sault Ste. Marie

INTRODUCTION

The permanent staff of the Sault Ste. Marie Resident Geologist's office consists of E.J. Leahy, Resource Geologist and G. Bennett, Resident Geologist. Brenda Fremlin continued on contract as secretary. The Drill Core Library program continued under the immediate direction of J.P. Donald. A report of the activities of the Drill Core Library staff is included in this report. E.D. Frey assumed the duties of District Geologist for the Wawa District on April 1, 1985.

A study of magnetic and geochemical anomalies and greenstone enclaves in the granitic terrain between the Montreal River and the Michipicoten metavolcanic-metasedimentary belt was continued under the direction of D.J.J. Tortosa with the assistance of E.J. Haley.

The Wawa Economic Geologist Program continued in 1985. As the second phase of the program, T. Howson, J. Melisek and W. Wing were employed on contract to compile Geological Data Inventory Folios (GDIF) of the Wawa-Goudreau area. The Sault Ste. Marie Industrial Minerals Program continued under the supervision of J.J. Kral, assisted by P. Beach during the field season.

The preceding three projects were originally funded by the Ministry of Northern Affairs (now the Ministry of Northern Development and Mines). The preliminary results for these projects are included in this report.

L. Ashick and D. Messenger were employed on a contract Fo compile Geological Data Inventory Folios of the Sault Ste. Marie and Batchawana areas. This work is funded by SPARC (Special Projects to Assist Resource Communities).

A pilot project to enter GDIF data into a local, stand-alone computerized database was undertaken in 1985. Entry programs were written by J.P. Donald and data was entered by D. Genys. As of December 1985, the following GDIFs have been completed and should be published by Spring, 1986: Anderson Township, Bruyere Township, Corbiere Township, Copenace Township, Daumont Township, Dolson Township, Dumas Township, Dunphy Township, Echum Township, Gaudry Township, Glasgow Township, Hughes Township, Loach Township, Lunkie Township, Raaflaub Township, Riggs Township, Running Township, Tupper Township, West Township, and Wishart Township.

In October of 1985, M.J. Cook, assisted by S.F. Uhler, carried out a reconnaissance survey of known tailings areas and "ore" piles of past gold producers in the Wawa-Goudreau area.

J. Lucuik assisted with computer data entry under the Experience '85 program during July and August.

RESIDENT GEOLOGIST ACTIVITIES

The number of public inquiries to the Sault Ste. Marie Resident Geologist's office in 1985 was down only a little from the record years of 1983 and 1984. As a result, much of the Resident Geologist's time was spent responding to requests for information and consultation. In addition, talks on general geological subjects and the results of exploration in the Hemlo area were given to a local high school. A geological field trip through the Thessalon area was conducted for an industry group. A few days were spent on a reconnaissance of the geology of Michipicoten Island. The Resident Geologist assisted John A.C. Fortescue, Ontario Geological Survey, with a remote sensing evaluation in the Montreal River area in August. The Resident Geologist visited twelve active and nine inactive properties during the 1984 field season. Research was continued on a study of the lower Huronian stratigraphy and Huronian volcanic rocks between Elliot Lake and Sault Ste. Marie. Most of the Resident Geologist's time was spent in administrative duties pertaining to two permanent and four temporary projects.

During the past year, the Resource Geologist gave presentations at two local schools; supervised the preparation of Geological Data Inventory Folios; supervised an industrial minerals project carried out by J. Kral, and prepared six sets of rocks and minerals for the Sault Ste. Marie School Board. A detailed literature search and field investigations were carried out by the Resource Geologist with reference to the Bruce Mines hazard lands. He also carried out ongoing revisions to the microfiche assessment file library; indexed and added to the technical articles file. The Resource Geologist spent a great deal of time assisting visitors to the Sault Ste. Marie office and responding to inquiries from local prospectors, industry, and the public.

WAWA DISTRICT GEOLOGIST ACTIVITIES

The office of the Wawa District Geologist has been in service since January 2, 1985. Permanent staff consists of E.D. Frey, District Geologist. Temporary field and office assistance was provided in October and November by S.F. Uhler. Administrative and logistical support is provided by the Wawa District of the Ministry of Natural Resources (MNR).

The area served by the District Geologist is the northern half of the Sault Ste. Marie Mining Division. It corresponds to the Wawa District of the Ministry of Natural Resources, with the omission of Leeson, Baltic, and Kildare Townships (Figure 9.1).

Office facilities include an updated reference library of Ontario and federal government geological maps and reports on the geology of the Wawa district, a microfiche file of mining claim assessment work reports for the district, and a microfiche reader-printer. In addition, mining claim maps, tags, and prospector licenses are sold by the MNR Land Management Branch.

Operation funding has been provided partially by the Wawa Economic Geologist program of the former Ministry of Northern Affairs (now the Ministry of Northern Development and Mines) and the Mineral Deposits Section of the Ontario Geological Survey (OGS).

The primary activities of the Wawa District Geologist consist of providing information services and technical advice to prospectors and geologists from the exploration, academic, and government communities, and to the general public. Much of this work was in the form of conducting 31 organized and impromptu field trips to examine Wawa area geological features and (mainly) gold occurrences.

Sampling and preliminary mapping of twenty new occurrences and dormant and developing prospects provided additional assistance to prospectors, and information for future new and updated Geological Data Inventory Folios. The District Geologist also visited six major active exploration projects.

Other field activities included presenting introductory geological lectures and field trips to three MNR Junior Ranger camps; brief geological reconnaissances of the southern and western shore of Michipicoten Island and the Hawk Lake-Manitowok Lake contact zone of the Wawa metavolcanic-metasedimentary belt and "external" granitic terrain; a preliminary appraisal of the mappability of strain indicators in the Wawa area; and continued reconnaissance scale Quaternary mapping of the Hawk Junction NTS map sheet. Office and telephone consultations totaled 451 for the first 11 months of the year. Direct service to Wawa MNR District included editing geological introductions for several forest management plans and participating on the District Roads Committee.

External conferences and field trips attended included: the Institute on Lake Superior Geology in Kenora, the Canadian Institute of Mining and Metallurgy Granite-Related Mineral Deposits Conference in Halifax, the OGS Hemlo-Geraldton field trip, and the OGS Building Stone Seminar in Kingston-Cornwall.

TAILINGS INVENTORY

A tailings inventory survey of past-producing gold mines in the Wawa-Goudreau areas was intitated in October 1985. The field work was supervised by the Wawa District geologist and carried out by M.J. Cook assisted by S.J. Uhler. The known tailings disposal areas and "ore" dumps of sixteen past producers were surveyed using simple chain and compass methods. The calculated volumes and tonnages of materials surveyed and location maps will be released as an open file report. A limited number of samples were collected for analysis by the Geoscience Laboratories of the Ontario Geological Survey.

CURRENT RESEARCH IN THE WAWA AREA

V. Coleman of Carleton University is conducting a study of the deformation of variolites in the Wawa-Goudreau area as part of the requirement for a B.Sc. degree in geology.

T.M. White is preparing a B.Sc. dissertation at the University of Western Ontario on the subject of glacial till genesis in the White River area.

R.G. Reid, presently at the University of Windsor, is studying the volcanic stratigraphy and geochemistry in the Mishibishu Lake area.

K. Thomson is continuing a study of the clastic and chemical metasediments of part of the Hemlo area, including White Lake Provincial Park.

G. E. McGill, of the faculty of the University of Massachusetts, is conducting structural studies in Chabanel Township.

C. Chrady, a Ph.D. candidate at the University of Massachusetts, is conducting structural studies in Chabanel Township.

CLAIM STAKING ACTIVITY

Between January 1 and November 30, 1985, 1603 mining claims were recorded in the Sault Ste. Marie Mining Division. This compares to 1555 mining claims staked during the same period in 1984.

MINING ACTIVITY

The Algoma Ore Division of the Algoma Steel Corporation Limited continued to mine siderite iron ore at the George W. MacLeod Mine in Wawa during 1985, except during a 5-week shutdown between late July and early September. Production for 1985 through the end of November was 1.24 million long tons of iron sinter from 1.8 million long tons of ore.

Denison Mines Limited continued production of uranium oxide from its mine and mill at Elliot Lake.

Rio Algom Limited continued operation of the New Quirke, Stanleigh and Panel Mines in the Elliot Lake area. Uranium oxide production for the first nine months of 1985 was reported to be slighly lower than the comparable period for 1984. Rio Algom is proceeding with the construction of a 150 ton per day yttrium plant which is scheduled for completion in 1987.

In the fall of 1985, Sill Lake Silver Mine Limited resumed mining and milling operations at the former Prace Mine in Vankoughnet Township. The essential elements of the recently constructed 120 ton per day mill include a ball mill, two Rikker spirals, and 10 flotation cells. Eighteen men are employed at the Sill Lake facility. Eighty tons of lead-silver concentrates were shipped in 1985.

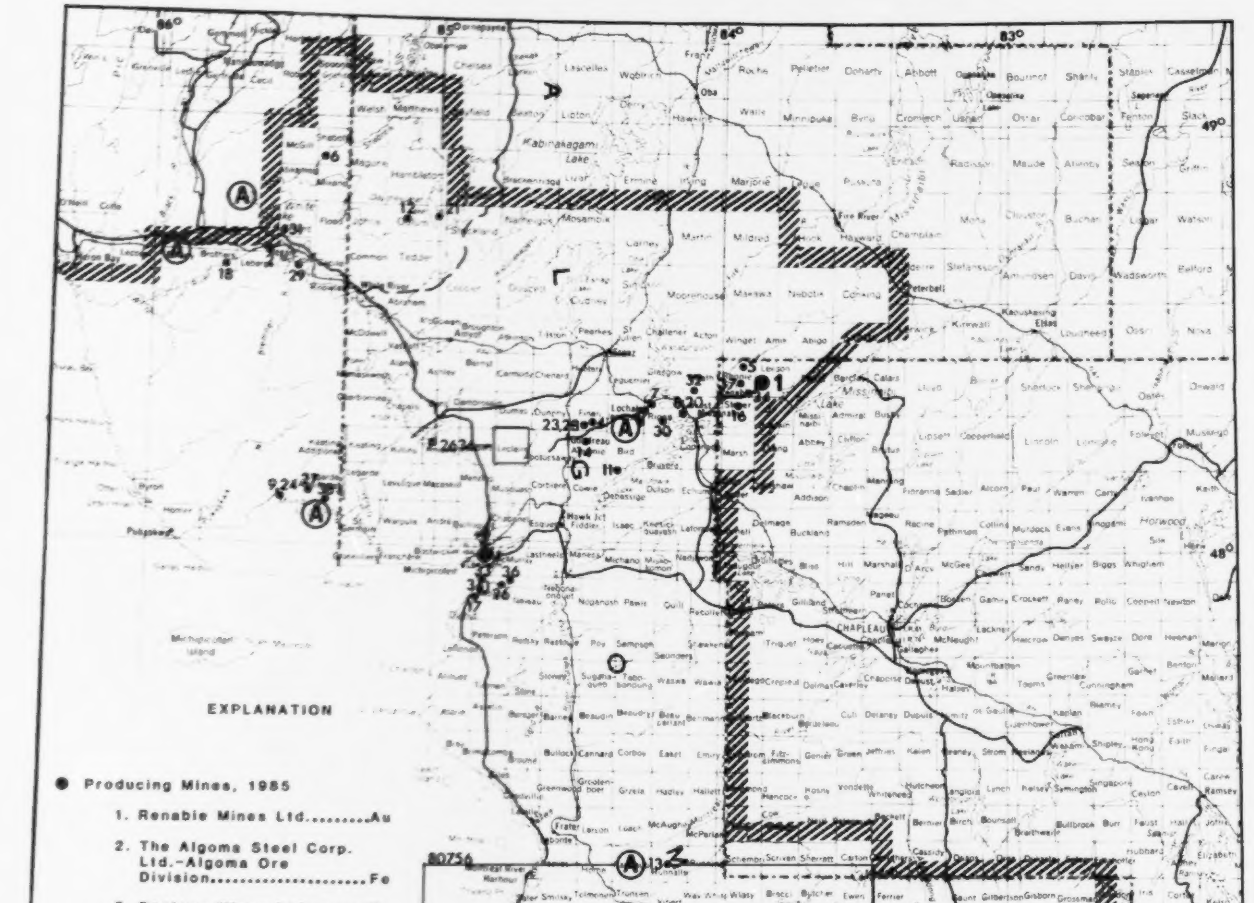

EXPLANATION
● Producing Mines, 1985
1. Renabie Mines Ltd.........Au
2. The Algoma Steel Corp. Ltd.-Algoma Ore Division......................Fe
3. Denison Mines Ltd.........U
4. Rio Algom Ltd.
New Quirke Mine.........U
Panel Mine..................U
Stanleigh Mine.............U
5. Sill Lake Silver Mine.......Ag,Pb
6. Algoma Metal Refining Incorp. ....Cu
• Exploration Activity, 1985 (keyed to Table 2)
Ⓐ Location of O.G.S. Field Party, 1985
Map or Report issued by the Ontario Geological Survey, 1985 (keyed to Table 1).
P - Preliminary Map
80756 - Geochemical Series Map
Boundary of Resident Geologist's Area
SCALE
0
25 mi.
0
20
40 km
84°
85°
86°
83°
49°
48°
47°
46°
CHAPLEAU
North Channel
DRUMMOND ISLAND
ST JOSEPH
BLIND RIVER
MANITOULIN
Michipicoten Island
Kabinakagami Lake
80756

Figure 9.1
SAULT STE. MARIE RESIDENT GEOLOGIST'S AREA

Algoma Metal Refining Incorporated shipped 200 tons of copper concentrate to Kidd Creek Mines Limited from its adit and mill in Gould Township. About 30 tons of this concentrate originated as "flux ore" from the Dolbreck Mines Limited property in Parkinson Township. The capacity of the 125 ton per day mill on the property is currently being increased.

Sill Lake Silver Mine Limited, Algoma Metal Refining Incorporated, and Dolbreck Mines Limited are operated by Elsadon Explorations Limited, a privately owned corporation.

EXPLORATION ACTIVITY

Mineral exploration activity in the Sault Ste. Marie Mining Division in 1985 continued at a relatively high, but slightly reduced level, from that of the previous years. Again, gold was the commodity of choice. Base-metal prospects rarely received attention unless there were known associated precious metals.

Table 9.1 summarizes the exploration activity in the Sault Ste. Marie Mining Division during 1985.

GOLD

Gold exploration, fueled in several cases by successful "flow-through" financing, led an increasing pace of exploration through the year in the district. Table 9.1 and Figure 9.1 provide a summary of exploration activity in Wawa District during 1985. The major activities, highlighted below, were reported by personal communication with company representatives.

Canamax Resources Incorporated commenced underground exploration of its Kremzar Gold Prospect in Finan Township in November with a spiral ramp to facilitate bulk sampling. An extensive surface drilling program has continued throughout the year, indicating reserves of 870 000 tons of ore at a grade of 0.23 ounce gold per ton. The property is a 50-50 joint venture with Kremzar Gold Mines Limited (79% controlled by Algoma Steel Corporation Limited).

In the Goudreau area, Muscocho Explorations Limited has completed 29 drillholes for a total length of 16 100 feet (4900 m), mostly on the western zone of the former Algoma Summit Gold Mines (Magino) Property. The project is a joint venture with McNellen Resources Incorporated. Further drilling is planned for 1986.

In the Mishibishu Lake area, Muscocho Explorations Limited completed 98 drillholes totaling 46 000 feet (14 000 m) on its gold prospect, shared with Flanagan McAdam Resources Incorporated (50%) and Windarra Minerals Limited (25%). Westfield Minerals Limited completed 9 drillholes for a total of 1890 feet (575 m) on the "Discovery" gold showing of its portion of the same mineralized zone, southeast of the Muscocho Prospect. Both companies plan to continue exploration in 1986.

In Rennie Township, Canamax Resources Incorporated completed nine drillholes on its Conboy Lake zinc-silver-gold joint venture prospect with Westfield Minerals Limited.

Monk Gold Mines Limited began extensive exploration of its Naveau and Rabazo Townships gold prospect in November. Ground geophysical surveys and over 15 000 feet (4500 m) of diamond drilling have been contracted for the remainder of 1985. In addition, the company has begun underground exploration through the expansion of an existing shallow decline. Further work is planned for 1986.

Sault Meadows Energy Corporation and First Canadian Energy Corporation Incorporated completed a mapping, trenching, and 2500-foot (750 m) drilling program on their joint venture gold prospect on the Centennial Mine Property in Naveau Township. Exploration will continue in 1986.

Golden Vale Explorations Corporation completed 2 drillholes of 600 feet (180 m) each on its Debassige Township gold prospect. No further work is planned at the present time.

Massive Energy Limited holds 263 claims by staking and an additional 32 claims by option arrangements in the Batchawana-Pangis area about 70 km north of Sault Ste. Marie. The property includes parts of Davieaux, Desbiens, Tronsen, and Olsen Townships. During the winter of 1985, Massive Energy completed a 5000-foot drilling program of 29 holes in Davieaux Township. In March of 1985, the company reported that hole No. 10, collared about 40 m east of the trench on the previously known gold occurrence of New Hiawatha Mines Limited, intersected 67.5 feet (core length) of 0.103 ounce gold per ton, including a 16.4-foot section of 0.246 ounce gold per ton. Hole No. 9 (from the same setup) intersected 46.3 feet of 0.069 ounce gold per ton, including 16 feet of 0.105 ounce gold per ton. The mineralized zone is at the bedrock surface. The company geologist describes the mineralized unit as "iron formation" and part of the geochemically anomalous (in gold) chert-pyrite unit which has been the focus of much, but by no means all, of Massive Energy's exploration effort in the Batchawana area. The company recently announced that it has secured financing to carry out a definition drilling program on the mineralized zone.

Sands Minerals Corporation holds 203 claims in Vibert Township in the Batchawana area immediately north of the Massive Energy property referred to in the preceding paragraph. A ground Max-Min electromagnetic survey, a magnetometer survey, and a soil geochemical survey were carried out in 1985.

Master Resources and Development Limited acquired an option to earn up to 50% interest in the 35 claim group of Dejour Mines Limited in Davieaux Township. This property is immediately south of the Massive Energy Property. In 1985, Master Resources completed soil geochemical surveys begun by Dejour Mines Limited and carried out reconnaissance and detailed geological surveys over the claim group.

Jonpol Explorations Limited purchased 135 claims in Norberg and Nicolet Townships of the Batchawana area in 1984. These claims include the former Tribag Mine, a past producer of copper and silver. In 1985, Jonpol carried out low level airborne magnetic surveys followed by a diamond drilling program as part of a search for additional copper-precious metal bearing breccia pipes of the Tribag type.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 9.1

Number on Figure	Individual or Company	Activity
1.	Algoma Silver-Lead Limited	Drilling, Deroche Township
2.	Asamera Inc.	Geophysical survey, trenching, drilling, Laberge Township
3.	Bridget Lake Resources Inc.	Stripping, trenching, Rabazo Township
4.	Canamax Resources Inc.	Prospecting, geological mapping, stripping, trenching, drilling, underground exploration, Finan, Aguonie, and Jackson Township
5.	Canamax Resources Inc.	Geophysical survey, drilling, Rennie Township
6.	Carroll, Daniel	Trenching, Mikano and Shabotik Townships
7.	Clement, G.C.	Stripping, Riggs Township
8.	Desjardins, Yves	Prospecting, West Township
9.	Durham Resources Inc.	Stripping, trenching, Mishibishu Lake area
10.	Enertex Developments Inc.	Geological mapping, Shedden Township
11.	Golden Vale Explorations Corp.	Geophysical survey, drilling, Debassige Township
12.	Halverson, Lloyd	Prospecting, trenching, Odlum Township
13.	Hussey, Floyd	Geophysical survey, Runnals Township
14.	International Corona Res. Ltd.	Prospecting, geophysical-geochemical surveys, Abotossaway, Aguonie, and Bird Townships
15.	Jonpol Explorations Ltd.	Airborne magnetometer survey, drilling, Nicolet, Norberg Townships
16.	Junior Mine Services Ltd.	Trenching, geophysical surveys Stover, Meath, West, and Rennie Townships
17.	Kustec, Stan	Trenching, Rabazo Township
18.	Lac Minerals Ltd.	Drilling, Brothers and Laberge Townships
19.	Lincoln Resources Ltd.	Prospecting, trenching, geophysical survey, drilling, Jacobson Township
20.	Loydex Resources Inc.	Trenching, drilling, West Township
21.	Mascot Gold Mines Ltd.	Geological mapping, geochemical, geophysical surveys, Hambleton, Odlum, Tedder, and Strickland Townships
22.	Massive Energy Corporation	Stripping, sampling, drilling, Desbiens Township.
23.	McNellen Resources Inc.	Drilling, Finan Township
24.	McQuinty, W.J.	Geological mapping, soil sampling, Mishibishu Lake area
25.	Mid North Engineering Services	Airborne geophysical survey, Olsen Township.
26.	Monk Gold and Resources Ltd.	Geophysical surveys, trenching, drilling, underground exploration, Naveau and Rabazo Townships
27.	Muscocho Explorations Ltd.	Geological mapping, drilling, Mishibishu Lake area
28.	Muscocho Explorations Ltd.	Trenching, drilling, Finan Township
29.	Noranda Exploration Co. Ltd.	Geological mapping, geophysical survey, Dennis, White, and Oskabukuta Lakes area
30.	Noranda Exploration Co. Ltd.	Prospecting, stripping, trenching, Riggs and Jacobson Townships
31.	Ore Quest Consultants	Geophysical surveys, trenching, Bryant Township
32.	Pak-Man Resources Inc.	Stripping, geophysical survey, Meath and West Townships
33.	Roller Resources Ltd.	Drilling, Rabazo Township
34.	Royex Gold Mining Corp.	Geological mapping, geochemical, geophysical surveys, trenching, drilling, Rennie and Stover Townships
35.	Rupert, R.J.	Assaying, Ryan Township
36.	Sault Meadows Energy Corp. & First Canadian Energy Corp.	Prospecting, geological mapping, trenching, drilling, Naveau Township
37.	Taylor, Calvin	Trenching, drilling, Rennie Township
38.	Westfield Minerals Ltd.	Drilling, Mishibishu Lake area

TABLE 9.2 ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

AEM - Airborne Electromagnetic Survey
AMAG - Airborne Magnetometer
A.Photo - Air Photo
B.TILL - Basal Till
DD - Diamond Drilling
EM - Electromagnetic Survey
GEM - Ground Electromagnetic
GEOCHEM - Geochemical Survey

GMAG - Ground Magnetometer
GRAD - Ground Radiometric
IP - Induced Polarization
OV - Overburden
RPT - Report
RSTVY - Resistivity
STR - Stripping
WRK.RPT - Work Report

Ag - Silver
Au - Gold
Co - Cobalt
Cu - Copper
Fe - Iron
Mo - Molybdenum
Zn - Zinc

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Abotossaway	42C/2	Bonzano Ex.	Au	Asses.	GMAG,EM,GEOCHEM	1984	Abotossaway 0045	
Abotossaway	42C/2	Bonzano Ex.	Au	Asses.	GEOL,GEOCHEM	1984	Abotossaway 0046-A1	
Aguonie	42C/2	Canamax Res.	Au	Asses.	AMAG,EM	1984	Finan 0028-A1	
Aguonie	42C/2	Noranda Ex.	Au		GEOL,DD,ASSAYS	1976	Aguonie 0018-A1	
Aguonie	42C/2	Noranda Ex.	Au		GEOL,ASSAYS	1976	Aguonie 0018-B1	
Aguonie	42C/2	Noranda Ex.	Au		GEOL,ASSAYS	1976	Aguonie 0018-C1	
Aguonie	42C/2	Noranda Ex.	Au		GEOL,ASSAYS	1976	Aguonie 0024-A1	
Aguonie	42C/2	Noranda Ex.	Au		GEOL,TRENCH	1976	Aguonie 0024-B1	
Aguonie	42C/2	Noranda Ex.	Au		GEOL,TRENCH,	1976	Aguonie 0024-C1	
Aguonie	42C/2	Noranda Ex.	Au		ASSAYS			
Aguonie	42C/2	Noranda Ex.	Au		DD,ASSAYS	1982	Aguonie 0026-A1	
Albanel	41J/11	Mortimer/Coyle Syn.	Au	Asses.	DD	1984	Albanel 0048-A1	
Bailloquet	42C/2	Algoma Steel Corp.	Au		AMAG + EM	1980	Lendrum 0018-A1	
Bird	42C/8	Canamax Res.	Au	Asses.	AMAG,EM	1984	Finan 0028-A1	
Bird	42C/8	Noranda Ex.	Au		GEOL,DD,ASSAYS, TRENCH	1981	Bird 0016-A1	
Bird	42C/8	Noranda Ex.	Au		GEOL,DD,ASSAYS	1982	Bird 0016-B1	
Bostwick	41N/15	Algoma Steel	Au		AMAG + EM	1980	Lendrum 0018-A1	
Bridgland	41J/6	Eldon Ms.	Au	Asses.	DD	1985	Bridgland 0030	
Bruyere	42C/1,8	Cyr, G	Au	Asses.	AMAG + EM	1984	Finan 0036	
Bruyere	42C/1,8	Kingswood Ex.	Au	Asses.	AMAG + EM	1985	Bruyere 0022	
Bruyere	42C/1,8	Kingswood Ex.	Au	Asses.	ASSAYS	1984	Bruyere 0021-A1	
Bruyere	42C/1,8	Tundra Gold Ms.	Au	Asses.	AMAG + EM	1984	Dolson 0016	
Bruyere	42C/1,8	Kingswood Ex.	Au	Asses.	GMAG,IP,RSTVY, GEOCHEM,GEOL	1983	Bruyere 0020	
Carney	42C/9,16	McKinnon, D.	Au	Asses.	AMAG + EM	1983	Mosambik 0015-A1	
Chabanel	42C/2	Hemgold Res.	Au	Asses.	GMAG + EM,GEOL, GEOCHEM	1983	Chabanel 0051	
Chabanel	42C/2	Algoma Steel	Au		AMAG + EM	1980	Lendrum 0018-A1	
Chabanel	42C/2	Michipicoten Iron Ms.	Au		RPT,DD,ASSAYS	1943	Corbiere 0030	
Chesley	41J/12	Chesley Enter. Haugeneder, J.	Au,Cu.	Asses	DD	1981	Chesley 0014-A1	
Chesley	41J/12	Haugeneder, J.	Au,Cu.	Asses.	DD	1984	Chesley 0015-A1	
Chesley	41J/12	Haugeneder, J.	Au		Trench	1984	Chesley 0015-B1	
Cooper	42C/10,11	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Cooper 0010-A1	
Corbiere	42C/2	Michipicoten Iron Ms.	Au		RPT,DD,ASSAYS	1943	Corbiere 0030	
Copenace	42C/1,8	Tundra Gold Ms.	Au	Asses.	AMAG + EM	1984	Dolson 0016	
Cowie	42C/1	Noranda Ex.	Au		GEOL,ASSAYS	1976	Aguonie 0018-C1	
Dahl	42C/6,7	Captain Consol.	Au	Asses.	GMAG + EM,GEOL., DD,GEOCHEM	1983	Dahl 0012	
Dambrossio	42C/7	Amhawk Res.	Au	Asses.	GEOL,GEOCHEM	1983	Dambrossio 0012	
Dambrossio	42C/7	MacDonald, A.	Au	Asses.	GMAG + EM,GEOL	1984	Dambrossio 0013	
Davieaux	41N/1	Dejour Ms. L	Au	Asses.	RPT,MAG + EM, GEOCHEM	1984	Davieaux 0015	
Debassige	42C/1	Algoma Steel	Au		AMAG + EM	1980	Debassige 0017-A1	
Debassige	42C/1	Golden Vale Ex.	Au	Asses.	GMAG,IP,RSTVY	1984	Debassige 0016	
Dunphy	42C/7	Cline Dev.	Au	Asses.	AMAG + EM	1984	Jacobson 0063	
Duncan	41K/9	Longbow Ex.	Au	Asses.	RPT,GMAG+ EM,IP	1983	Jarvis 0025	
Echum	42C/1	Tundra Gold Ms.	Au	Asses.	AMAG + EM	1984	Dolson 0016	
Echum	42C/1	Tundra Gold Ms.	Au	Asses.	AMAG + EM	1983	Dolson 0017-A1	
Esquega	42C/2	Michipicoten Iron Ms.	Au		RPT,DD,ASSAYS	1943	Corbiere 0030	
Esquega	42C/2	Lakemount Ms.	Au		RPT,DD,ASSAYS	1959	Esquega 0030-A1	
Esquega	42C/2	Amax Ex.	Au	Asses.	DD	1980	Esquega 0029-A1	
Finan	42C/7,8	McNellen Res.	Au	Asses.	DD	1984	Finan 0029-A1	
Finan	42C/7,8	Cline Dev.	Au	Asses.	AMAG	1984	Jacobson 0063	
Finan	42C/7,8	Patte, A R	Au	Asses.	GMAG + EM,GEOL	1985	Finan 0031	
Finan	42C/7,8	Patte, A R	Au	Asses.	GMAG + EM,GEOL	1984	Finan 0030	
Finan	42C/7,8	McNellen Res. Inc.	Au	Asses.	GEM,GEOL	1985	Finan 0032	
Finan	42C/7,8	McNellen Res. Inc.	Au	Asses.	GMAG+EM,GEOL	1985	Finan 0033	
Finan	42C/7,8	Canamax Res.	Au	Asses.	GEOL	1985	Finan 0034	
Finan	42C/7,8	McNellen Res. Inc.	Au	Asses.	DD	1985	Finan 0035-A1	
Finan	42C/7,8	Cyr, G	Au	Asses.	AMAG + EM	1984	Finan 0036	
Finan	42C/7,8	McNellen Res. Inc.	Au	Asses.	DD	1985	Finan 0037-A1	
Franchere	42C/3	New Beginnings	Au	Asses.	AMAG + EM	1983	Groseilliers 0016	
Franchere	42C/3	MacMillan Engy.	Au	Asses.	GEOL,GEOCHEM	1983	42C/03SW 0028	
Glasgow	42C/8	Noranda Ex.	Au	Asses.	GEOL.	1984	Meath 0029 A1	
Glasgow	42C/8	Cyr, G	Au	Asses.	AMAG + EM	1984	Finan 0036	
Groseilliers	42C/3	New Beginnings	Au	Asses.	AMAG + EM	1983	Groseilliers 0016	
Groselliers	42C/3	MacMillan Engy.	Au	Asses.	GEOL,GEOCHEM	1983	42C/03SW 0028	

TABLE 9.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hambleton	42C/14	Pezamerica	Au	Asses.	DD	1984	Hambleton 0013	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0014-A1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0014-C1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0015-A1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1984	Hambleton 0015-C1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0016-A1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1984	Hambleton 0016-C1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0017-A1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0017-C1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0018-A1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0018-C1	
Hambleton	42C/14	Pezamerica	Au	Asses.	GMAG + EM	1983	Hambleton 0019	
Hughes	41J/13	Campbell, C. Powley, S.	Ag, Zn	Asses.	AMAG+EM+RAD, GMAG, IP, DD GEOL	1982	Hughes 0017	
Hughes	41J/13	Campbell, C.	Au	Asses.	DD, ASSAYS	1984	Hughes 0018-A1	
Jacobson	42C/8	Vega G. Ex.	Au	Asses.	B.TILL, GEOL., ASSAYS	1984	Jacobson 0061	
Jacobson	42C/8	Cline Dev.	Au	Asses.	GEOL, TRENCH, ASSAYS	1984	Jacobson 0062-A1	
Jacobson	42C/8	Noranda Ex.	Au		Trench, ASSAYS	1970	Jacobson 0062-B1	
Jacobson	42C/8	Cline Dev.	Au		AMAG + EM	1984	Jacobson 0063	
Jacobson	42C/8	Cline Dev.	Au	Asses.	GEOL, IP, RSVTY, GEOCHEM	1983	Jacobson 0064	
Jacobson	42C/8	Lincoln Res.	Au	Asses.	GMAG + EM	1984	Jacobson 0065	
Jacobson	42C/8	Longbow Ex.	Au	Asses.	GEOL. DD	1981	Jarvis 0024-A1	
Jacobson	42C/8	Archibald F T	Au	Asses.	GMAG+EM, GEOL	1985	Jacobson 0066	
Jacobson	42C/8	Lincoln Res. Inc.	Au	Asses.	GEM	1985	Jacobson 0067	
Jacobson	42C/8	Cline Dev.	Au		DD, ASSAYS	1985	Jacobson 0068	
Jacobson	42C/8	Archibald F T	Au	Asses.	GMAG+EM, GEOL	1985	Jacobson 0069-A1	
Jacobson	42C/8	Archibald F T	Au	Asses.	GEOL., ASSAYS	1985	Jacobson 0070-A1	
Jarvis	41K/9	Longbow Ex.	Au	Asses.	RPT, GMAG+EM,	1983	Jarvis 0025	
Jarvis	41K/9	Longbow Ex.	Au	Asses.	IP, DD, ASSAYS	1984	Jarvis 0026-A1	
Jogues	42C/7	Morgan Hydro	Au	Asses.	Assaying	1978	Jogues 0023-A1	
Jogues	42C/7	Morgan Hydro	Au	Asses.	Assaying	1984	Jogues 0023-C1	
Keating	42C/6	Noranda Ex.	Au	Asses.	DD	1979	Keating 0013-Ca	
Leclaire	42C/7	McGowan, R J	Au	Asses.	GEOL. TRENCH, DD, ASSAYS	1984	Leclaire 0017-A1	
Leclaire	42C/7	Algoma Central Ry	Au		RPT, GMAG, DD	1973	Leclaire 0018-A1	
Leclaire	42C/7	Noranda Ex.	Au		GMAG + EM, GEOL	1981	Leclaire 0018-B1	
Leclaire	42C/7	Noranda Ex.	Au		GEOL, ASSAYS	1981	Leclaire 0018-C1	
Leclaire	42C/7	Noranda Ex.	Au		GEOL, ASSAYS	1981	Leclaire 0019-A1	
Leclaire	42C/7	Noranda Ex.	Au		GEOL, ASSAYS	1981	Leclaire 0019-B1	
Leclaire	42C/7	Noranda Ex.	Au		GEOL, DD, ASSAYS	1981	Leclaire 0019-C1	
Leeson	42B/5	North Goldfields Res.	Au	Asses.	GMAG+EM, ASSAYS, TRENCH, DD	1984	Leeson 0030	
Lendrum	42C/2	Algoma Steel	Au		AMAG + EM	1980	Lendrum 0018-A1	
Lendrum	42C/2	Algoma Steel	Au		AMAG + EM	1980	Lendrum 0017	
Magone	42C/14	Oasis Res.	Au	Asses.	GMAG + EM, GEOL	1984	Magone 0010	
Magone	42C/14	Oasis Res.	Au	Asses.	GEOL + A.Photo	1984	Magone 0011-A1	
Marsh	42C/8	Achates Res. Unicorn Res.	Au	Asses.	GMAG + EM, GEOL, GEOCHEM	1984	Marsh 0011	
Marsh	42C/8	Cyr, G	Au		AIR MAG + EM	1984	Finan 0036	
Matthews	42F/3	Lobo Gold & Res	Au	Asses.	GEOL, GEOCHEM	1984	Matthews 0012-A1	
Matthews	42F/3	Lobo Gold & Res	Au	Asses.	DD, ASSAYS	1984	Matthews 0013	
McMurray	42C/2	Pango G.Ms.	Au	Asses.	GMAG+EM, GEOL	1983	McMurray 0054	
McMurray	42C/2	Pango G.Ms.	Au	Asses.	OV, GEOCHEM	1984	NcMurray 0055	
McMurray	42C/2	Dunraine Ms.	Au	Asses.	GEOL, DD	1982	McMurray 0056	
McMurray	42C/2	Henderson, R.D.	Au	Asses.	TRENCHING	1983	McMurray 0057	
McMurray	42C/2	Riordan, K.	Au	Asses.	ASSAYING	1984	McMurray 0058-A1	
McMurray	42C/2	Henderson, R.D.	Au	Asses.	TRENCHING, ASSAYING	1984	McMurray 0058-B1	
McMurray	42C/2	Henderson, R.D.	Au		TRENCHING	1984	McMurray 0058-C1	
McMurray	42C/2	Henderson, R.D.	Au	Asses.	ASSAYING	1984	McMurray 0058-D1	
McMurray	42C/2	Dunraine Ms	Au	Asses.	RPT, GEM, GEOCHEM	1983	McMurray 0060	
Meath	42C/8	Noranda Ex.	Au	Asses.	GEOL.	1984	Meath 0028-B1	
Meath	42C/8	Noranda Ex.	Au	Asses.	GEOL.	1984	Meath 0028-C1	
Meath	42C/8	Noranda Ex.	Au	Asses.	GEOL.	1984	Meath 0029-A1	
Meath	42C/8	Noranda Ex.	Au	Asses.	GEOL.	1984	Meath 0030	
Meath	42C/8	Noranda Ex.	Au	Asses.	DD, ASSAYS	1982	Meath 0031-A1	
Musquash	42C/2	Noranda Ex.	Au		GEOL, TRENCH, ASSAYS	1981	Musquash 0013-A1	
Nameigos	42C/8	Noranda Ex.	Au	Asses.	AMAG	1983	Nameigos 0018	
Naveau	41N/15	Gratton, G. Clement, C.	Au	Asses.	GMAG, GEOL.	1984	Naveau 0021-A1	
Naveau	42N/15	First Cdn. Engy	Au	Asses.	GEOL.	1985	Naveau 0022	
Nicholas	41J/10	Enertex Devs.	Au	Asses.	IP + RSVTY		Nicholas 0030	
Nicholas	41J/10	Enertex Devs.	Au	Asses.	GMAG + EM		Nicholas 0031-A1	
Nicholas	41J/10	Enertex Devs.	Au	Asses.	GRAD, GEOL, TRENCH		Nicholas 0032	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	DD	1984	Odlum 0010-B1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Odlum 0011-A1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Odlum 0011-C1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Odlum 0012-A1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Odlum 0012-C1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1983	Odlum 0013-A1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Odlum 0013-C1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Odlum 0014-A1	
Odlum	42C/15	Pezamerica Res.	Au	Asses.	GMAG + EM	1984	Odlum 0014-C1	
Olsen	41N/1	MidNorth Eng. Bush Pilot Corp.		Asses.	AMAG + EM	1983	Olsen 0015	
Olsen	41N/1	MidNorth Eng. Bush Pilot Corp.	Au	Asses.	AMAG+EM, GEOL	1985	Olsen 0016-A1	

TABLE 9.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Pilot Harbour	41N/13NE	Central Crude L.	Au	Asses.	GMAG+EM,GEOL, ASSAY	1983	41N/14NW	0014
Pilot Harbour	41N/13NE	Group Holdings	Cu	Asses.	AMAG+EM,GEOL, ASSAY	1985	41N/13NW	0012-A1
Point Isacor	41N/14NW	Central Crude L.	Au		WRK.RPT.	1985	41N/14NW	0013-A1
Point Isacor	41N/14NW	Central Crude L.	Au		WRK.RPT.	1985	41N/14NW	0013-B1
Point Isacor	41N/14NW	Central Crude L.	Au	Asses.	GMAG+EM,GEOL, ASSAYS	1983	41N/14NW	0014
Point Isacor	41N/14NW	Wasabi Res. L.			AIR EM,GMAG+EM, GEOL	1983	42C/03SW	0029
Abbie Lake	42C/03NW	Noranda Ex.	Au		GEOL,DD,ASSAYS	1978	42C/03NW	0013-A1
Abbie Lake	42C/03NW	MacMillan Engy.	Au		GEOL,GEOCHEM	1983	42C/03SW	0028
Mishibishu Lake	42C/03SW	Sanderson, C.D.	Au	Asses.	TRENCHING,ASSAY	1983	42C/03SW	0026-A1
Mishibishu Lake	42C/03SW	Sanderson, C.D.	Au	Asses.	TRENCHING,ASSAY	1983	42C/03SW	0026-B1
Mishibishu Lake	42C/03SW	Central Crude	Au	Asses.	GMAG+EM,GEOL, ASSAYS	1983	41N/14NW	0014
Mishibishu Lake	42C/03SW	MacMillan Engy.	Au	Asses.	GEM,GEOL,ASSAYS, GEOCHEM	1984	42C/03Sw	0027
Mishibishu Lake	42C/03SW	MacMillan Engy.	Au	Asses.	GEOL,GEOCHEM	1983	42C/03SW	0028
Mishibishu Lake	42C/03SW	Wasabi Res. L.		Asses.	AEM,GMAG+EM, GEOL	1983	42C/03SW	0029
Mishibishu Lake	42C/03SW	Westfield Mnrls.		Asses.	RPT,GMAG+EM, GEOCHEM,GEOL	1983	42C/03SW	0030
Mishibishu Lake	42C/03SW	Wasabi Res. L.	Au	Asses.	GEM,GEOL, GEOCHEM	1984	42C/03SW	0031
Pukaskwa River	42C/04NE	Intern. Bibis Tin	Cu		GEOL,DD,ASSAYS	1967	42C/04NE	0016-A1
Pukaskwa River	42C/04NE	Wasabi Res.		Asses.	AMAG+EM	1985	42C/04SE	0014
David Lake	42C/04SE	Wasabi Res.		Asses.	AMAG+EM	1985	42C/04SE	0014
Denis Lake	42C/11NW	Noranda Ex.	Au	Asses.	AEM	1984	42C/12NE	0028
White Lake - South	42C/12NE	Stateside Engy.	Au	Asses.	GMAG+EM,GEOL, GEOCHEM	1983	42C/12NE	0026
White Lake - South	42C/12NE	Coresam Res.	Au	Asses.	GEOCHEM	1983	42C/12NE	0027
White Lake - South	42C/12NE	Noranda Ex.	Au	Asses.	AEM	1984	42C/12NE	0028
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	OV DRILLING	1983	42C/12NE	0029
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	GEOCHEM	1984	42C/12NE	0030
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	GEOL	1984	42C/12NE	0031
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	GEOL	1984	42C/12NE	0032
White Lake - South	42C/12NE	Asamera Inc.	Au	Asses.	GRAD,GEOL, GEOCHEM	1984	42C/12NE	0033
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	RPT,STR+TRENCH.	1985	42C/12NE	0034-A1
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	GEOL.	1984	42C/12NE	0035
White Lake - South	42C/12NE	Asamera Inc.	Au	Asses.	GMAG+EM	1984	42C/12NE	0036
White Lake - South	42C/12NE	Asamera Inc.	Au	Asses.	GMAG + EM,IP, RSVTY	1984	42C/12NE	0037
White Lake - South	42C/12NE	Golden Shield	Au	Asses.	GEM,GEOL, GEOCHEM	1983	42C/12NE	0038
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	GEOCHEM	1984	42C/12NE	0039
White Lake - South	42C/12NE	Hawley, R.G.	Au	Asses.	GMAG + EM	1984	42C/12NE	0040
White Lake - South	42C/12NE	Lac Minerals	Mo,Fe	Asses.	GEOL,ASSAYS	1985	42C/12NE	0041
White Lake - South	42C/12NE	Lac Minerals	Au	Asses.	GEOCHEM	1985	42C/12NE	0042
White Lake - South	42C/12NE	Golden Terrace	Au	Asses.	GEOL,ASSAYS	1984	42C/12NE	0043
White Lake - South	42C/12NE	Lac Minerals		Asses.	DD	1985	42C/12NE	0044
White Lake - South	42C/12NE	Asamera Inc.	Au	Asses.	DD	1985	42C/12NE	0045
White Lake - South	42C/12NE	Asamera Inc.	Au	Asses.	GEOCHEM	1985	42C/12NE	0046-A1
Molson Lake	42C/12NW	Onitap Res. Inc.	Au	Asses.	DD,ASSAYS		42C/12NW	0059
Molson Lake	42C/12NW	Lac Minerals	Au	Asses.	GEOCHEM	1984	42C/12NW	0061
Molson Lake	42C/12NW	Lac Minerals		Asses.	DD	1984	42C/12NW	0062
Molson Lake	42C/12NW	Lac Minerals		Asses.	DD	1984	42C/12NW	0063-A1
Molson Lake	42C/12NW	Teck Corp.		Asses.	DD	1984	42C/12NW	0063-C1
Molson Lake	42C/12NW	Pricemore Res.	Au	Asses.	RPT,ASSAYS,DD	1984	42C/12NW	0064
Molson Lake	42C/12NW	Lac Minerals		Asses.	DD	1984	42C/12NW	0065-A1
Molson Lake	42C/12NW	Lac Minerals		Asses.	DD	1985	42C/12NW	0065-C1
Oskabukata Lake	42C/12SE	Stateside Enrgy	Au	Asses.	GMAG + EM,GEOL,	1983	42C/12NE	0026
Oskabukata Lake	42C/12SE	Noranda Ex.	Au	Asses.	AIR EM	1984	42C/12NE	0028
Oskabukata Lake	42C/12SE	Noranda Ex.	Au,Cu,Ag	Asses.	GEM,GEOL ASSAYS	1984	42C/12SE	0012
Herrick Lake	42C/12SW	March Res.	Au	Asses.	GMAG + EM	1983	42C/12SW	0017
Herrick Lake	42C/12SW	March Res.	Au	Asses.	GEOCHEM	1983	42C/12SW	0018
White Lake - North	42C/13SE	Coresame Res.	Au	Asses.	GMAG + EM,IP RSTVY	1984	42C/13SE	0022
White Lake - North	42C/13SE	Daiwan Eng.	Au	Asses.	GMAG + EM	1984	42C/13SE	0023
White Lake - North	42C/13SE	Burda D	Au	Asses.	GMAG+EM,GEOL	1985	42C/13SE	0024-A1
Shabotik River	42C/14NW	Blakey, W.	Au	Asses.	AMAG + EM	1984	42C/14NW	0011
Shabotik River	42C/14NW	Golden Rule Res.	Au	Asses.	GMAG + EM. RSTVY	1984	42C/14NW	0012
Mussy Lake	42D/09SE	Schiralli, R.A.	Au	Asses.	GMAG + EM	1983	42D/09SE	0021
Mussy Lake	42D/09SE	Zone Petroleum	Au	Asses.	DD,ASSAYS	1984	42D/09SE	0022
Mussy Lake	42D/09SE	Zone Petroleum	Au	Asses.	ASSAYING	1985	42D/09SE	0023-A1
Mussy Lake	42D/09SE	Ontario L	Au	Asses.	ASSAYING	1983	42D/09SE	0023-C1
Mussy Lake	42D/09SE	Zone Petroleum		Asses.	GEOL	1984	42D/09SE	0024
Mussy Lake	42D/09SE	Zone Petroleum	Au	Asses.	GEOL,GEOCHEM	1984	42D/09SE	0025

TABLE 9.2 **Continued**

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Palmer	41N/2	Ontario Inc	Au	Asses.	DD, ASSAYS	1984	Palmer 0033	
Palmer	41N/2	Paquette, J F	Au	Asses.	GEOL, TRENCH, DD, ASSAYS	1985	Palmer 0034-A1	
Raaflaub	41N/8	Manwa Ex.	Au		AMAG+EM, RSVTY	1984	Runnells 0018	
Rabazo	41N/15	Roller Res. Consil Minerals L.	Au	Asses.	GMAG, GEOL., ASSAYING	1984	Rabazo 0031	
Rabazo	41N/15	Golden Pond Res.	Au	Asses.	GMAG + EM, GEOL	1984	Rabazo 0032	
Rabazo	41N/15	Golden Pond Res.	Au	Asses.	GMAG + EM, GEOL	1983	Rabazo 0033	
Rabazo	41N/15	Monk Gld.Ms.	Au	Asses.	GMAG + EM, IP., RSVTY, GEOCHEM	[illegible]	Rabazo 0034	
Rabazo	41N/15	Bridget Lake Res.	Au	Asses.	GMAG + EM, GEOL	1983	Rabazo 0035-A1	
Rabazo	41N/15	BKK Cons. L.	Au	Asses.	AMAG + EM	1984	Rabazo 0036	
Rabazo	41N/15	Roller Res.	Au	Asses.	DD, ASSAYS	1985	Rabazo 0037-A1	
Rabazo	41N/15	Canabec Ex.	Au	Asses.	GMAG+EM, GEOL	1985	Rabazo 0037-E1	
Rabazo	41N/15	Roller Res.	Au	Asses.	DD, ASSAYS	1985	Rabazo 0038-A1	
Rabazo	41N/15	Roller Res.	Au	Asses.	DD, ASSAYS	1985	Rabazo 0038-C1	
Rabazo	41N/15	Golden Pond Res.	Au	Asses.	GEOL, ASSAYS	1984	Rabazo 0039-A1	
Rabazo	41N/15	Canabec Ex.	Au	Asses.	DD	1985	Rabazo 0039-C1	
Raimbault	41J/10	Enertex Devs.	Au	Asses.	GMAG + EM	1984	Nicholas 0031-A1	
Raimbault	41J/10	Enertex Devs.	Au	Asses.	GMAG, GEOL, TRENCH	1984	Nicholas 0032	
Rennie	42B/5	Westfield Mins.	Au	Asses.	DD, ASSAYS	1984	Rennie 0033-A1	
Rennie	42B/5	Noranda Expl.	Au	Asses.	GEOL.	1984	Rennie 0033-C1	
Rennie	42B/5	Westfield Mins.	Au	Asses.	GMAG + EM, GEOL.	1984	Rennie 0034	
Rennie	42B/5	Noranda Ex.	Au	Asses.	GEOL.	1984	Rennie 0035-A1	
Rennie	42B/5	Westfield Mins.	Au	Asses.	DD, ASSAYS	1984	Rennie 0036-A1	
Riggs	42C/8	Oasis Res.	Au	Asses.	GMAG + EM, GEOL.	1984	Riggs 0020	
Riggs	42C/8	Oasis Res.	Au	Asses.	GEOL+A.PHOTO, ASSAYS	1984	Riggs 0021-A1	
Rose	41J/5	Midpines Ex.	Au		PROSPECTUS	1978	Rose 0013-A1	
Runnalls	41N/8	Noranda Ex.	Au	Asses.	GMAG + EM	1983	Runnalls 0016-A1	
Runnalls	41N/8	Noranda Ex.	Au	Asses.	GMAG + EM	1983	Runnalls 0017-A1	
Runnalls	41N/8	Manwa Ex	Au	Asses.	AMAG+EM, RSVTY	1984	Runnalls 0018	
Running	41N/1	Noranda Ex.	Au	Asses.	GMAG + EM	1983	Runnalls 0017-A1	
Running	41N/1	Manwa Ex.	Au		AMAG+EM, RSVTY	1984	Runnalls 0018	
Ryan	41N/2	Rupert, R.	Au	Asses.	ASSAYS	1985	Ryan 0035-A1	
Ryan	41N/2	Rupert, R.	Au	Asses.	DD, ASSAYS	1982	Ryan 0032	
Ryan	41N/2	Amax Mnrs.	Au	Asses.	RPT., GEOL., DD, ASSAYS	1983	Ryan 0033	
Ryan	41N/2	Rupert, R.	Au	Asses.	ASSAYS	1981	Ryan 0034-A1	
Ryan	41N/2	Unknown	Au	Asses.	RPT.		Nicholet 0037-Ca	
St. Germain	42C/3	MacMillan Engy.	Au	Asses.	AMAG + EM	1983	Groseilliers 0015	
St. Germain	41C/3	MacMillan Engy.	Au		GEOL, GEOCHEM	1983	42C/03SW-0028	
Schembri	41O/5	Manwa Ex.			AMAG+EM, RSVTY	1984	Runnalls 0018	
Shedden	41J/8	Enertex Devs.		Asses.	GRAD, GEOL, DD, ASSAYS, TRENCH	1985	Shedden 0020	
Shedden	41J/8	Enertex Devs.	Au	Asses.	GMAG+EM, ASSAYS	1985	Shedden 0021-A1	
Stover	42C/8	McGowan, R.J.	Au	Asses.	AMAG + EM		Stover 0026	
Stover	42C/8	Archates Res. L.	Au	Asses.	GMAG + EM, GEOCHEM		Marsh 0011	
Stover	42C/8	Cyr, G			AMAG+EM	1984	Finan 0036	
Tedder	42C/11	Pezamerica Res.	Au	Asses.	DD	1984	Tedder 0010-A1	
Tedder	42C/11	Pezamerica	Au	Asses.	GMAG + EM	1984	Tedder 0010-B1	
Tronson	41N/1	Manwa Ex.			AMAG+EM, RSVTY	1984	Runnalls 0018	
Tronson	41N/1	Mid-North Eng.			AMAG+EM, GEOL	1985	Olsen 0016-A1	
Vibert	41N/1	Manwa Ex.			AMAG+EM, RSVTY		Runnalls 0018	
Warpula	42C/3	MacMillan Engy	Au		GEOL, GEOCHEM	1983	42C/03SW 0028	
Way-White	41N/1	Noranda Ex.	Au	Asses.	GMAG + EM	1983	Way-White 0012-A1	
Wells	41J/6	Paynter, R.	Co, Ag		RPT, TRENCHING, ASSAYS	1984	Wells 0011-A1	
West	42C/8	Golden Hope Res.	Au	Asses.	GMAG + EM, GEOL.	1983	West 0018	
West	42C/8	Cyr, G			AMAG+EM	1984	Finan 0036	
Wlasy	41N/1	Noranda Ex.		Asses.	GMAG+EM	1983	Way-White 0012-A1	
Wlasy	41N/1	Manwa Ex.			AMAG+EM, RSVTY	1984	Runnalls 0018	
Wlasy	41N/1	Bridge, R J	Au		ASSAYING	1984	Wlasy 0012-A1	

SAULT STE. MARIE DRILL CORE STORAGE LIBRARY

For 1985, staff in the Sault Ste. Marie Core Storage Library included J. Melisek, D. Messenger, and M. Goudreau as geological assistants; R. Sanderson and P. MacEachern as summer assistants; and J. Donald as library geologist.

A total of 10 500 m of drill core was collected from 17 sites, representing 17 400 m of drilling. As of December 1985, the facility contained 53 000 m of core representing 175 000 m of drilling.

Most drill core was recovered by truck; however, 17% was transported by helicopter (to a trucking point), 23% by float plane, and 5% by boat. The remote core locations and difficult means of access necessitated the use of alternate transportation, thereby reducing the total amount of core retrieved in comparison to previous years.

In addition to drill core, the Core Library contains several thousand rock samples and hundreds of petrographic thin sections. Information regarding these items is stored in computer files for retrieval by staff at the clients' requests.

A biannually updated catalogue of the drill core inventory is available free upon request; clients can be added to an automatic mailing list at no charge by contacting the Sault Ste. Marie Resident Geologist's office.

ALGOMA RECONNAISSANCE GEOLOGY PROJECT

INTRODUCTION

The Algoma Reconnaissance Geology Project continued into its second year, concentrating on the granitic and gneissic terrains between the Michipicoten and Batchawana metavolcanic-metasedimentary belts (Figure 9.2, Area 2). The project was initiated in order to evaluate the source and nature of selected geological, geochemical, and geophysical anomalies within the granitic and gneissic terrains of the Algoma Region, and to determine whether they represented targets of possible economic interest for follow-up by the mining and exploration community.

Targets to be evaluated were based on aeromagnetic, geochemical, and geological anomalies defined by previous federal and provincial surveys. The reconnaissance study focused on the Kinniwabi Lake, and the Millwood areas (Figure 9.3), since these contained several metavolcanic-metasedimentary enclaves, geochemical, and geophysical anomalies, and were easily accessible by a well developed timber road system. Other geological and geophysical targets and mineral occurrences were accessed by helicopter, fixed-wing aircraft, boat, and all-terrain vehicles. Summer field work was based out of Wawa and started in mid-June under the supervision of D. Tortosa assisted by E. Haley.

GEOLOGICAL SETTING

The granitic and gneissic terrains throughout Area 2 (Figure 9.2) are shown on the geological compilation map, Map 2220 (Milne *et al.* 1972), as consisting of granitic, granodioritic, dioritic, and trondhjemitic gneisses and massive granitic rocks containing small isolated metavolcanic-metasedimentary enclaves. The rocks are transected by north-, east-, and northeast-trending lineaments, and by north-, northwest-, and northeast-trending diabase dikes. Card (1979) in a regional geological synthesis of the Central Superior Province shows the area as belonging to the Anjigami Gneiss Domain which consists predominantly of tonalitic and granodioritic gneisses intruded by felsic plutonic rocks and containing metavolcanic-metasedimentary enclaves interconnected by zones of migmatite.

The area under investigation is contained within a part of the Superior Province which has been interpreted by Percival and Card (1985) as representing an oblique cross section through a 20 km thick slab of Archean crust that was differentially uplifted along a major northwest-dipping thrust (the Ivanhoe Lake Cataclastic Zone). They base this interpretation, in part, on a continuous transition in erosional levels extending from the Michipicoten metavolcanic-metasedimentary belt (low grade, upper crust), through tonalite gneiss and felsic plutonic terrain (medium to high grade, mid crust), into heterogeneous high grade gneisses of the Kapuskasing Zone (deep crust).

The study area forms part of what Percival and Card (1985) refer to as the mid crust "megalayer" consisting of a tonalitic gneiss complex with large-scale domal structures and felsic intrusions. The gneissic complex contains large xenoliths of metavolcanic-metasedimentary rock, up to several kilometres long, which become more common near the margins of the Michipicoten metavolcanic-metasedimentary belt. U-Pb dates of zircons in the tonalitic gneisses (Percival and Card 1985) indicate that they were emplaced during the late stages of volcanism in the Michipicoten belt (2749 to 2696 Ma); this leads Percival and Card to suggest that the metavolcanic-metasedimentary enclaves were formed by the stoping the margins of the supracrustal pile.

FIELD INVESTIGATIONS

Metavolcanic-metasedimentary enclaves up to several kilometres long are contained within tonalitic to granodioritic gneiss and are interconnected and partly enveloped by zones of migmatite. The enclaves are composed predominantly of amphibolite and amphibole-feldspar gneiss; however, some enclaves contain sections of felsic to intermediate metasediments and metavolcanics (2G-3 and 2G-5, Figure 9.2). Three areas previously thought to be underlain by metavolcanics or metasediments (2G-2, 2G-6, and 2G-7, Figure 9.2) were not confirmed during ground follow-up. Area 2G-2 is underlain by tonalitic gneiss, migmatite, and gabbro intrusions; 2G-6 consists of quartzo-feldspathic paragneisses; and 2G-7 consists of quartzo-feldspathic paragneiss with a variable mafic mineral content. Two large metavolcanic-metasedimentary enclaves in the Kinniwabi Lake and Jackpine River area, 2G-1 and 2G-8 respectively (Figure 9.3), are covered by a blanket of glaciofluvial debris resulting in very poor outcrop exposure. The Kinniwabi Lake metavolcanic-metasedimentary segment is unique in that rock foliations are shallow dipping to nearly flat lying, and the immediately enclosing gneissic and migmatitic rocks display a shallow-dipping gneissosity.

Many northwest-trending linear aeromagnetic anomalies in the area coincide with the position of similar trending diabase dikes. Where dikes are exposed on surface, and particularly at rock cuts on Highway 101, they exhibit sharp contacts with the granitic and gneissic country rocks. There is little evidence of post-intrusion fracturing and shearing at the contacts, as commonly occurs in mafic dikes north of Sault Ste. Marie (Area 1, Figure 9.2). The northwest-trending dikes in the Wawa area have been correlated with the Matachewan swarm (Rb-Sr 2633 Ma; Gates and Hurley 1973) and the Sudbury swarm (ca. 1250 Ma; Van Schmus 1975). Several irregular aeromagnetic anomalies visited were either caused by mafic or tonalitic gneiss containing Fe-Ti oxides (2M-1 and 2M-3), or by magnetite-bearing cherty ironstone (2M-2, Figure 9.3).

Uranium geochemical anomalies in lake sediment and water (OGS-GSC 1979) were investigated in order to determine their source. Traverses over geochemical anomaly 2SSM-1 (Figure 9.2) indicate that the underlying rock is granite, intruded by radioactive pegmatites containing a black radioactive mineral (possibly uraninite). Background radioactivity (total count) over the granite is 2 to 3 times more than the surrounding tonalitic gneiss and migmatite terrain.

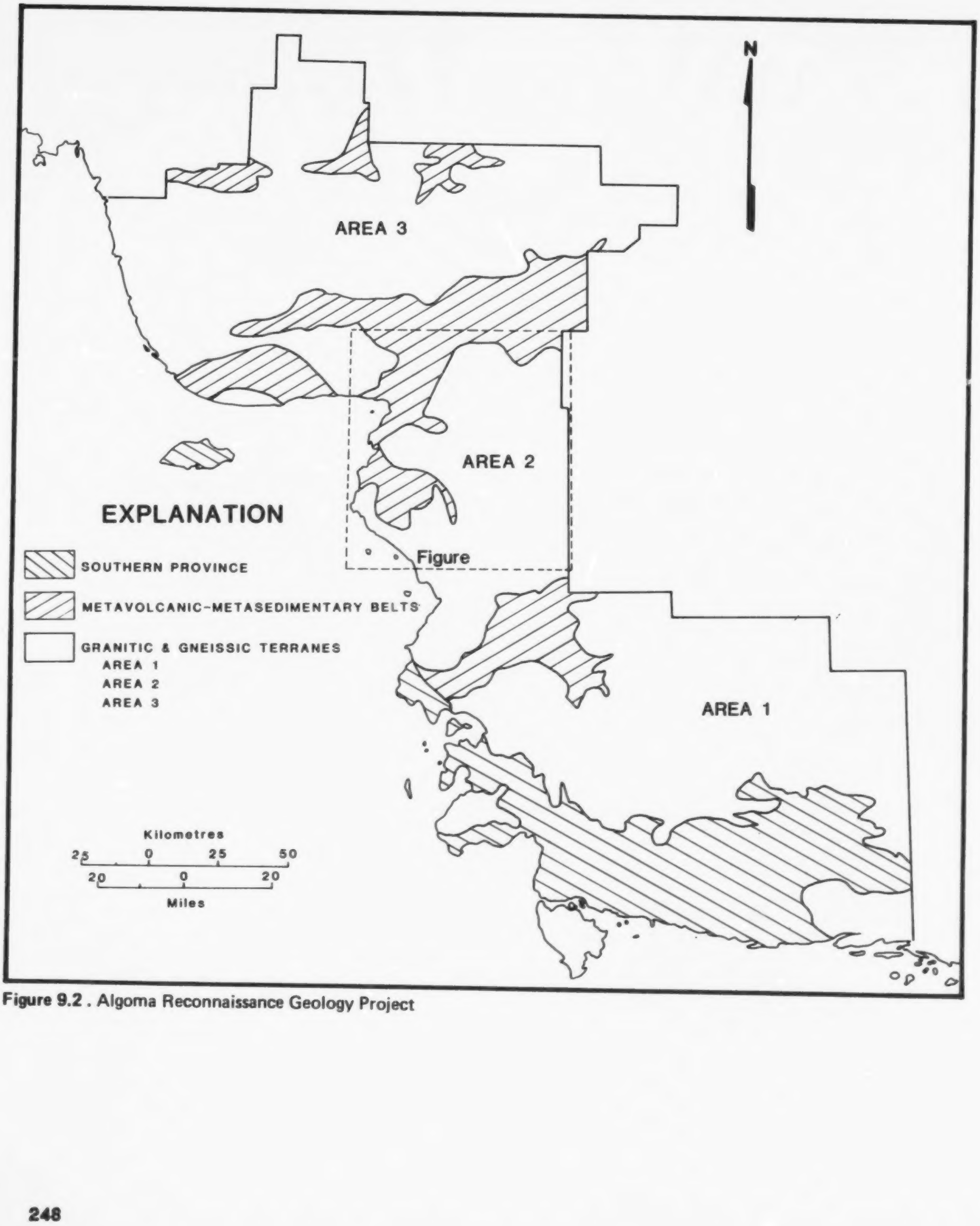
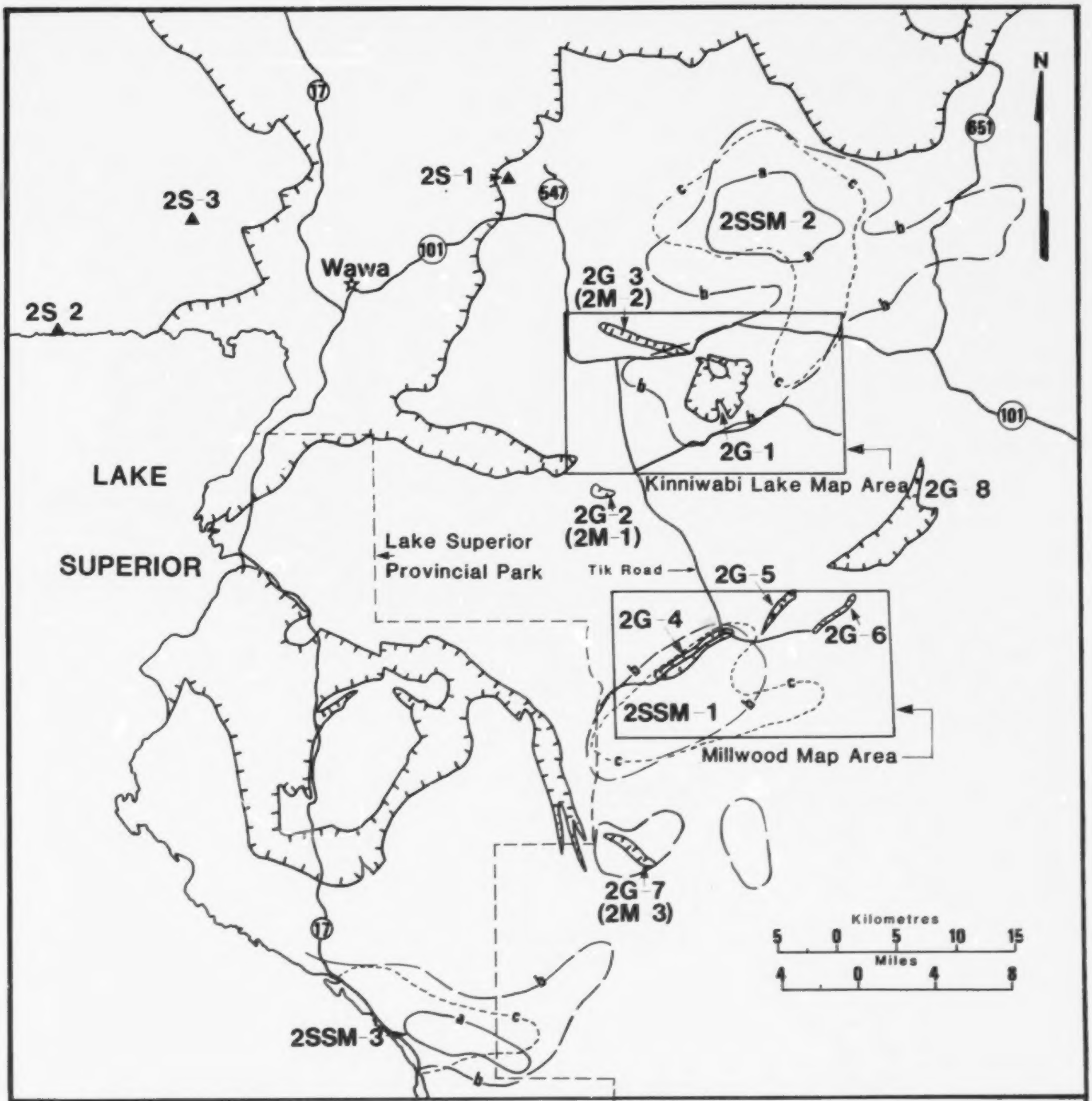

N
AREA 3
AREA 2
AREA 1
Figure
EXPLANATION
SOUTHERN PROVINCE
METAVOLCANIC-METASEDIMENTARY BELTS
GRANITIC & GNEISSIC TERRANES
AREA 1
AREA 2
AREA 3
Kilometres
25 0 25 50
20 0 20
Miles

Figure 9.2 . Algoma Reconnaissance Geology Project


N
2S-1
2S-3
2S 2
Wawa
17
101
547
651
2SSM-2
2G 3
(2M 2)
a
b
c
LAKE
SUPERIOR
2G 1
Kinniwabi Lake Map Area
2G 8
2G-2
(2M-1)
Lake Superior
Provincial Park
Tik Road
2G-5
2G-4
2G-6
2SSM-1
Millwood Map Area
2G-7
(2M 3)
Kilometres
5 0 5 10 15
Miles
4 0 4 8
2SSM-3

AEROMAGNETIC ANOMALIES

2M-1: Powerline Road Aeromagnetic anomaly (Tonolite Gneiss)
2M-2: Michipicoten Dam Aeromagnetic anomaly (Cherty Ironstone)
2M-3: Blackspruce Creek Aeromagnetic anomaly (Mafic Gneiss)

GEOLOGICAL TARGETS

Kinniwabi Lake Map Area

2G-1: Kinniwabi Lake
2G-2: Powerline Road
2G-3: Whitefish-Shikwamkwa Lake

Millwood Map Area

2G-4: Agawa River
2G-5: Mount Baldy
2G-6: Berry Lake
2G-7: Blackspruce Creek
2G-8: Jackpine River

MINERAL OCCURRENCES

2S-1: Regenery Metals Molybdenite Occurrence
2S-2: Crane Tungsten Occurrence
2S-3: Ranwick Molybdenite Occurrence

REGIONAL GEOCHEMICAL ANOMALIES (Uranium)

2SSM-1, 2SSM-2, 2SSM-3

Lake Sediments	a:	20 ppm U
	b:	7.6 20 ppm U
Lake Waters	c:	0.16 ppb U

NOTE: Hatchured boundaries represent the outlines of metavolcanic-metasedimentary belts or enclaves.

Figure 9.3 . Aeromagnetic anomalies examined in 1985

Geochemical anomaly 2SSM-2 overlies massive felsic plutonic rocks ranging from granite to granodiorite in composition and containing minor tonalite gneiss and migmatite. The size and shape of the anomaly tends to correlate roughly with the surface extent of the plutonic mass. Elevated uranium levels for geochemical anomaly 2SSM-3 (Figure 9.3) can be attributed, in part, to the presence of pitchblende occurrences in the immediate area. It would appear that the elevated concentration of uranium in lake sediments and waters in these anomalies is mostly derived from the surrounding uraniferous pegmatites and granites and, locally, from pitchblende occurrences of the Montreal River area. Friske (1985), in an interpretation of the geochemical data from the north shore of Lake Superior, shows that these anomalies are contained within a much broader and larger area of elevated uranium in lake sediments and waters, which is underlain by granitic and gneissic terrain. He attributes these regional trends to the above average uranium content in the underlying granitoid terrains, and to pitchblende mineralization in the Montreal River area.

The few mineral occurrences within the study area consist of either Mo (2S-1 and 2S-3, Figure 9.3) or Mo-W (2S-2) occurring in quartz veins transecting mostly granitic and gneissic country rocks. The Regnery Metals Molybdenite Occurrence (2S-1, Figure 9.3) consists of northeast-trending, southeast dipping quartz-sulphide veins up to 1 m wide and 30 m long which are closely associated with, and occur between, similar trending, coalescing diabase dikes intruding granite and quartz porphyry (Assessment File Esquega 0019, Sault Ste. Marie Resident Geologist's Office). A quartz-sulphide vein exposed on the surface consists of a 5 to 15 cm thick chalcopyrite-pyrite vein contained within an envelope, up to a metre wide, of silicified granite or quartz porphyry. Molybdenite occurs as disseminated flakes within quartz and at the contact between the sulphide vein and the quartz.

The occurrence was originally developed by Regnery Metals in the late 1930s for its molybdenum and (supposed) beryllium potential, utilizing an inclined shaft and workings at inclined depths of 90 and 230 feet (28 and 70 m). In 1958, International Ranwick Limited dewatered the shaft, resampled the underground workings, completed a drill program on the second level, and outlined 13 000 tons of ore at 0.11% Mo based on a 1.16 m mining width. Grab samples taken of vein material by the authors gave assays of 13% Cu, 2700 ppb Au, and 950 ppm Ni. Approximately 1 km east of the occurrence, along the access bush road, a quartz-sulphide vein was found contained within a northeast-trending diabase dike which assayed 2.9% Cu, and 110 ppb Au. (Analyses by the Geoscience Laboratories Ontario Geological Survey, Toronto.)

The Ranwick Molybdenite Occurrence consists of three main sets of quartz-filled gash fractures in quartzo-feldspathic gneisses and granodiorite. The quartz veins trend north-northeast, east-northeast, and south-southeast, dipping vertically, and ranging from 5 cm to 3 m wide and between 1 and 20 m long. Molybdenite occurs as 1 to 2 cm flakes and clusters of flakes in quartz near the vein contacts, and within a 10 cm envelope in the adjacent country rock. The mineralization tends to be sporadic and inconsistent along the vein contacts and within the quartz, and the veins are not spaced closely enough to be considered a 'stockwork'.

Trenching and drilling of the prospect was initially carried out by Superior Molybdenum Company Limited in 1939 who estimated a probable molybdenite content of 0.24% Mo on a bulk sample. In 1964, geological and magnetometer surveys were completed by the Algoma Central Railway Company, and in 1965 International Nickel re-drilled the prospect. Previous assays taken by the Algoma Central Railway from several trenches across the main mineralized zone gave a re-calculated average of 0.13% Mo over a 30-foot (10 m) width, and the International Nickel diamond-drill holes, which were set to intersect below the vein system, encountered narrower and fewer quartz veins than on surface.

The Crane Tungsten Occurrence consists of a zone up to 9 m wide of white, irregular quartz veins contained within an enclave of schistose metaconglomerate bounded by massive granodiorite. The granodiorite adjacent to the schist is micro-fractured over a distance of about 75 m from the east contact, and the conglomerate has been metamorphosed to quartz-biotite and quartz-amphibole schist containing 10% to 15% quartzo-feldspathic and mafic clasts. Scheelite occurs as grains disseminated in quartz and at the contact between quartz and schist. Molybdenite and pyrite are commonly present.

Previous work on the property by Nickel (1952) for Crane Company Limited consisted of detailed geological mapping, extensive stripping, trenching, and diamond drilling (Assessment Files, Sault Ste. Marie Mining Division). Mineral processing tests were later carried out in 1950 by Quebec Metallurgical Industries Limited who determined an average concentration of 0.15% W from mineralized diamond drill core. Flotation concentrate contained up to 0.05 ounce gold per ton and 0.01% to 0.02% Mo. Tonnage was estimated at 790 tons per vertical foot (Nickel 1952).

A report of the results of field work will be submitted to the Ontario Geological Survey for publication in the Spring of 1986, as an open file report. It will consist of two regional scale maps at 1:253 000; one showing the locations visited, geochemical anomalies, and geological data, and a second showing geological and aeromagnetic data. Areas where reconnaissance geology was focused will be presented on two 1:15 840 scale map areas (the Kinniwabi Lake Map Area and the Millwood Map Area, Figure 9.3). As a result of 1984 field work, a Ba-Zn-Pb occurrence was discovered on Saymo Lake by D. Tortosa (Saymo Lake Barite Occurrence; Tortosa, in press). The prospect has been staked and trenched by Mr. C. Campbell who plans to carry out a diamond drilling program during the winter of 1985-86.

INDUSTRIAL MINERALS PROJECT

This project is a continuation of the industrial minerals, and building and ornamental stone inventory for the Sault Ste. Marie Mining Division, begun in

1984. The objectives of the inventory are to: 1) delineate target areas of suitable building or ornamental stone; 2) examine deposits with industrial mineral applications; 3) assess the economic potential of selected deposits; and 4) promote the unique stones found in the area. It is hoped that the results of this inventory will encourage exploration for these commodities.

Field work was supplemented by a literature search of both Federal and Provincial geological reports. Laboratory work consisted of slabbing, polishing, thin section analyses, and sieve tests. Test results and polished stone specimens may be viewed at the Resident Geologist's office in Sault Ste. Marie.

The following summarizes of the work done during the 1985 field season. More detailed results will be made available as an open file report in 1986. Figure 9.4 shows the locations of the areas described below.

Area 1 consists largely of granitic terrain accessible by Highway 129. All drivable side roads for a distance of about 80 km along this highway were traversed to carry out a reconnaissance survey of 21 townships.

In this area, 15 building and ornamental stone evaluations were carried out but no deposit was found to be suitable for this use. Although the area has an abundant supply of granitic rocks, where observed, they displayed one or all of the following unsuitable characteristics: 1) inconsistent grain size and colour over a large area; 2) intrusions of numerous randomly oriented pegmatite dikes of varying widths; and 3) fractures so closely spaced that quarrying would be impossible.

Two barite deposits within this granitic area were also visited: one near Frobel Lake in Casson Township and one near the Cheney Mine in Gould Township. Both were found to be small occurrences with little economic potential at this time.

An abandoned stone quarry was located in Rioux Township about 6 km northeast of Seymour Lake Road. Approximately 600 tons of a highly altered diorite have been removed from this site for use in local road construction.

Area 2 (Figure 9.4) extends from Echo Bay to Blind River and includes the north shore of Lake Huron and St. Joseph's Island. Most of this area is underlain by rocks of the Huronian Supergroup which were examined in 1984 for possible ornamental and industrial applications. Field work in 1985 was concentrated on a small area of granitic rocks in the southeast part of Area 2, and on a deposit of Cambrian sandstone near St. Joseph's Island. Five building stone evaluations were carried out in the granitic area; two exhibit suitable characteristics to be of potential value.

1. "Red Granite"

A red, potassic-rich, biotite granite (Robertson 1963) is situated in Thompson Township along the shore near Mississagi Bay. Joints were observed to be from 20 cm to 2 m apart with no preferred orientation apparent. The deep red colour and medium grain size are consistent over a large area, no deleterious minerals are present and the stone takes a fine polish. Potential reserves of this stone may be high, but drift cover makes assessment difficult.

2. "Pink Granite"

Several poorly exposed outcrops of massive, medium-grained, pink, biotite granite (Robertson 1963) were examined in Thompson Township, 8 km southeast of Dean Lake. Where exposed, the stone is relatively fracture free, grain size and colour are consistent, samples polish well and contain no deleterious minerals. The very attractive appearance of this stone when polished would warrant a more detailed examination of this area.

A deposit of silica sand was examined on Campement d'Ours Island near St. Joseph's Island, 50 km southeast of Sault Ste. Marie. The sand deposit can be followed along the southwestern shore of the island for a distance of approximately 500 m.

The sand is derived from the underlying Munising Formation which is a relatively clean, friable, quartz sandstone of Cambrian age. On St. Joseph's Island, the Munising Formation is overlain by Ordovician limestone. Much of the limestone cap has been eroded from Campement d'Ours Island, allowing disintegration of the Munising Formation.

Reserves of the Campement d'Ours silica sand deposit had previously been estimated to be between 800 000 and 2 000 000 tons of sand yielding a silica content in excess of 99% (Hewitt 1963). Field work in 1985 has shown that approximately 70 acres of the southern section of the island is overlain by the highly weathered Munising Formation, which in places is up to l6 m thick (Kral 1985). This is a very promising potential source of high quality silica.

Area 3 (Figure 9.4) extends north from Sault Ste. Marie for a distance of about 51 km. Three evaluations were conducted in this area and are described below.

1. Jacobsville Formation

The Jacobsville Formation is a red to white, medium- to fine-grained sandstone of Cambrian age. Beds range in thickness from 6 mm up to 1.5 m. Crossbedding and ripple marks are common features. Thin shale and siltstone interbeds are commonly present.

The Jacobsville Formation is exposed only sporadically from Sault Ste. Marie to Batchawana Bay, and good sections are difficult to observe (McConnell 1927). The sandstone is usually covered by a varying thickness of overburden; stripping would be necessary to establish a sizable quarry.

In the past, the Jacobsville sandstone has been well utilized as a building stone in Sault Ste. Marie, Ontario and Sault Ste. Marie, Michigan. Many attractive churches and business buildings are a testament to the durability of the stone. At the present time, a quarry with a licenced area of 8.3 hectares, located in section 17 of Tarentorus Township, is being operated on an intermittent basis by Mr. E. Koseba and Mr. R. Rancourt. They supply flagging, ornamental, and facing stone to the local area.

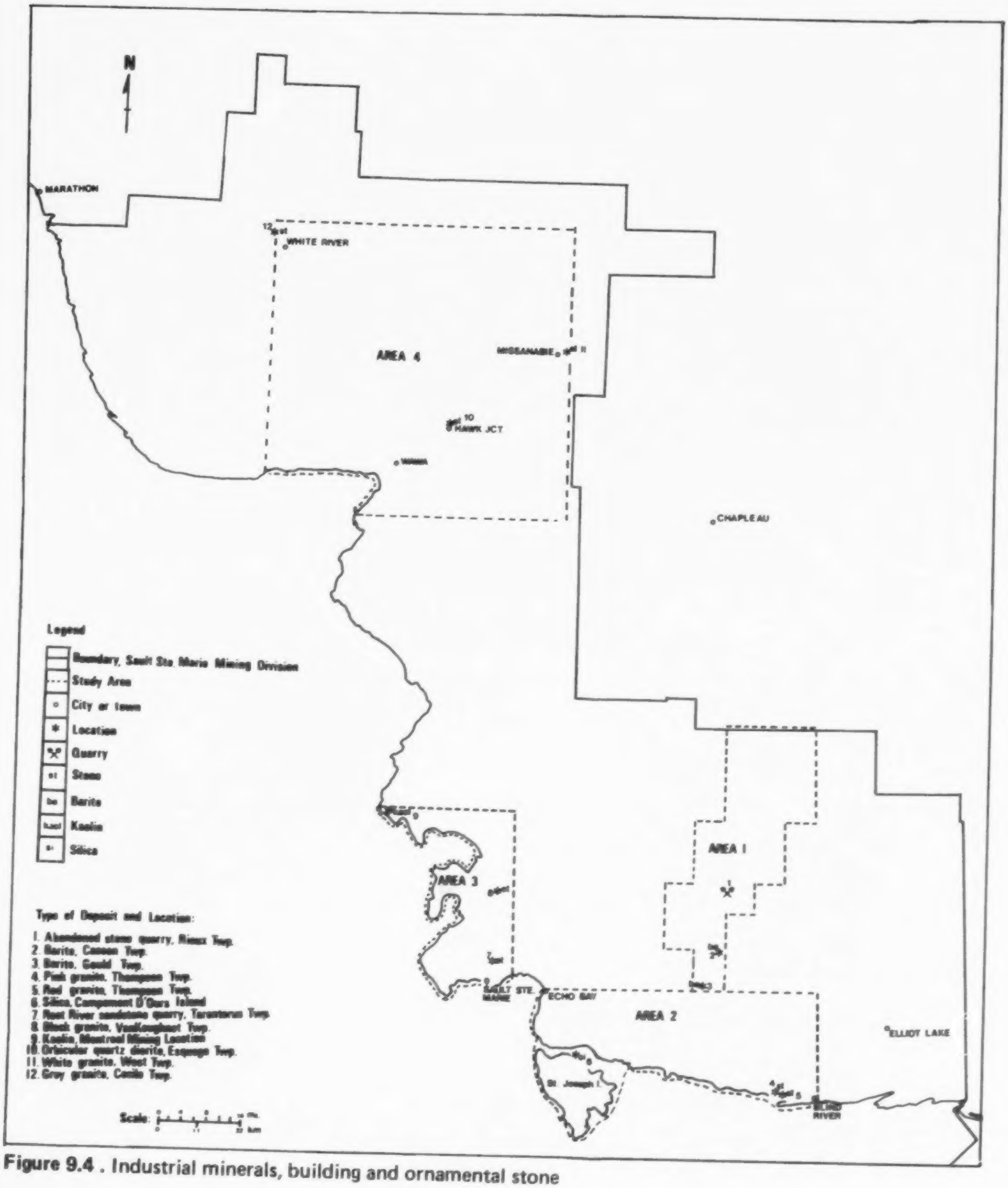

N
MARATHON
WHITE RIVER
AREA 4
MISSANABIE
HAWK JCT
WAWA
CHAPLEAU
AREA 1
AREA 3
AREA 2
SAULT STE. MARIE
ECHO BAY
ELLIOT LAKE
St. Joseph I.
BLIND RIVER
Legend
Boundary, Sault Ste. Marie Mining Division
Study Area
City or town
Location
Quarry
Stone
Barite
Kaolin
Silica
Type of Deposit and Location:
1. Abandoned stone quarry, Rimmer Twp.
2. Barite, Cannon Twp.
3. Barite, Gould Twp.
4. Pink granite, Thompson Twp.
5. Red granite, Thompson Twp.
6. Silica, Campement D'Ours Island
7. Root River sandstone quarry, Tarentorus Twp.
8. Black granite, VanKoughnet Twp.
9. Kaolin, Montreal Mining Location
10. Orbicular quartz diorite, Esquega Twp.
11. White granite, West Twp.
12. Grey granite, Cecile Twp.
Scale
0
km

Figure 9.4 . Industrial minerals, building and ornamental stone

TABLE 9.3 . MAPS AND REPORTS PERTAINING TO THIS RESIDENT GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports	Preliminary Maps - Geological Series	Aggregate Resources Publications
OFR 5565	P. 2636 P. 2835	ARIP 124
Coloured Maps	**OGS Geochemical Series Maps**	
2472	MAP 80756	

Potential reserves of the Jacobsville Formation sandstone are high.

2. "Black Granite"

A "black granite" is located in VanKoughnet Township, 30 km northeast of Sault Ste. Marie. It is a black-grey to black, massive, medium-grained, quartz diabase (McConnell 1927) which polishes well. Where examined, fracture spacing varied from 10 cm to 1.5 m. No sheeting was observed. Colour and grain size are consistent. Very minor amounts of pyrite are present (<1%) but no staining was observed.

Reserves are high, and the large area of the deposit (approximately 10 km long by 1 km wide by 66 m high) enhances the possibilty of finding a location suitable for quarrying. Further detailed mapping is planned for this deposit in 1986.

3. Kaolin

Two deposits of very low grade kaolin in altered Keweenawan felsite were examined on old Highway 17, near Mamainse, 50 km northwest of Sault Ste. Marie. These were found to be of little economic significance.

Area 4 (Figure 9.4) includes the granitic and greenstone terrain of the Michipicoten-White River region crossed by Highways 17N, 101, and 547. During reconnaissance work, begun near the end of the 1985 field season along the main highways, three potential building stone deposits were examined.

1. Quartz Gabbro

A small area of quartz gabbro (Sage *et al.* 1980) is located on a spur line of the Algoma Central Railway near Hawk Junction in Esquega Township. This stone has a striking appearance when polished due to a black matrix enclosing grey-green orbicules of plagioclase ranging in size from 3 mm to 2 cm. No deleterious minerals were observed. Joint spacing varies from 15 cm to 1 m. The deposit is small but provides excellent ornamental stone for the production of window lintels or table tops, if it is unsuitable as dimension stone.

2. Quartz Diorite

A massive, greenish white, medium-grained, quartz diorite (Srivastava and Bennett 1978) is located near the north shore of Dog Lake near Missinabie in West Township. Where observed, it is relatively fracture free and the colour and the grain size are relatively uniform. Preliminary results show the stone to polish well and further work is warranted to delineate the size of the deposit.

3. Biotite Granite

A large deposit of very pale grey, massive, fine-grained, biotite granite was examined on Highway 17 in Cecile Township, 12 km northwest of White River. The deposit is notable for the presence of a natural sheeting which is spaced from 0.5 to 1 m apart. A definite pattern of vertical joints is difficult to discern although the spacing varies from 20 cm to 1.5 m. Pyrite occurs in localized seams and lenses; however, areas were observed which were completely free of pyrite and further work is warranted to delineate these zones.

Although the stone polishes well, the colour may be too drab for a building stone but entirely suitable as a monument stone.

A display of the above-described rocks and minerals, as well as some of those reported on in Report of Activities 1984 (OGS MP 122), were displayed at the Ontario Geological Survey Open House in Toronto, in December, 1985.

The author dealt with three serious inquiries into ornamental stone, one for trap rock, and one for silica.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

P. Born and assistants carried out 1:15 840 scale geological mapping between Batchawana Bay and Goulais Bay, north of Sault Ste. Marie. The area mapped includes parts of Havilland, Tupper, Fenwick, and VanKoughnet Townships.

R.P. Sage continued the Ontario Geological Survey program of 1:15 840 mapping in the Wawa-Localsh area. The mapping of Abotossaway, Aguonie, and Bird Townships was completed, and most of Finan and Jacobsen Townships were mapped.

R.P. Bowen and J. Logothetis and assistants carried out 1:15 840 mapping in the Mishibishu Lake area during the 1985 field season. This is a helicopter-supported project and represents an effort by the Ontario Geological Survey to upgrade the geological mapping in an area of active mineral exploration.

K.B. Heather carried out detailed mapping of mineral occurrences and structural features in the Mishibishu Lake area during the 1985 field season.

G.M. Sirgusa and K.M. Chivers continued the Ontario Geological Survey's 1:15 840 scale geological mapping program in the Hemlo area. The area mapped is comprised of two contiguous rectangles, one rectangle extending along the Black River, north of Hemlo, and the second extending eastward toward the northern end of White Lake.

T.L. Muir continued a tectono-stratigraphic study in the Hemlo area in 1985. The area mapped includes the northern parts of Bomby and Lecour Townships.

A regional geochemical study of Michipicoten Island was completed under the direction of John A.C. Fortescue in August, 1985. During 1985 lakewater and sediment samples were collected from 94 locations on the island.

In September 1985, J.A.C. Fortescue and J.R. Webb continued a study of geochemistry and remote sensing data from parts of Home and Raaflaub Townships in the Montreal River area, and parts of Gap, Gaudry, Lunkie, and Nahwegezhic Townships in the Cowie Lake area.

Quaternary mapping in the Hemlo area continued in 1985 under the direction of R.S. Geddes. This year mapping was concentrated on the map sheets of Marathon (NTS 42 D/9), Manitouwadge (NTS 42 F/4), and White River (NTS 42 C/11).

Rainer R. Wolf completed mapping of the Paleozoic Geology of Cockburn Island in the North Channel of Lake Huron during the summer of 1985. Supplementary stratigraphic information was obtained from a test drillhole drilled in September of that year.

The preliminary results of the projects listed above and other field work carried out in 1985 by the Ontario Geological Survey, can be found in the Summary of Field Work and other Activities 1985, by the Ontario Geological Survey (MP 126).

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10. Sudbury Resident Geologist Area, Northeastern Region

W. Meyer[1], R.W. Campbell[2], R. Adlington[3], and F.H. Toews[3]

[1]Resident Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

[2]Resource Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

[3]Contract Geologist, Ontario Ministry of Northern Development and Mines, Sudbury

INTRODUCTION

The Sudbury Resident Geologist's area encompasses about 28 000 km^2 (Figures 10.1a and 10.1b). Geologically it can be divided as follows:

Paleozoic: Ordovician and Silurian marine sediments on Manitoulin and several smaller islands. These underlie about 18% of the area.

Proterozoic: Grenville Province. About 33% of the area belongs to the Grenville Front Tectonic Zone and Central Gneiss Belt; 160 km of the Grenville Front lie within the area.

Proterozoic: The Sudbury Igneous Complex and Whitewater Group sedimentary rocks cover about 4% of the area.

Proterozoic: Southern Province. Clastic sediments, volcanic rocks, and diabases of the Huronian Supergroup underlie about 21% of the area.

Archean: Granites, gneisses, and greenstones (volcanic-sedimentary belts) of the Superior Province underlie about 24% of the area. The granite to greenstone ratio is about 19:1.

Glacial till and organic overburden covers much of the bedrock.

The area is well known for its large nickel-copper-precious metal mines, many gold and base-metal prospects, and enigmatic geological features. These draw many companies, prospectors, and visitors to the area each year.

STAFF

Staff positions and changes in 1985 were as follows:

P.E. Giblin was Regional Mineral Resources/Land and Waters Coordinator for all of 1985.

J.M. Martins resigned as Acting Resident Geologist in early January.

W. Meyer held a contract position from the beginning of the year, and became Resident Geologist on August 26.

R.W. Campbell held a contract position from January 21 to October 2, when he became Resource Geologist.

R. Adlington worked on contract in the office from January to June, and from October to December. For three months he was assisted by M. Charette, R. Degagne, K. Lacey, and R. MacNeil.

F.H. Toews started a two-year investigation of gold mineralization between Sudbury and the Espanola area. Two senior assistants, M.E. Grant and M. Napoli, helped with field and office work, and three junior assistants, D. Beilhartz, M. Charette, and D. Pilkey helped with field work.

S. Scott was office and field assistant during the summer months.

Y. Paquette retired at the end of October, after having been secretary to the Resident Geologist for 23 years. T. Livingstone then filled that position on contract.

STAFF ACTIVITIES

SUMMARY

Staff of the Resident Geologist's office visited properties and areas of problematic geology, collected drill core, guided tours across the Sudbury Structure and Grenville Front, assisted prospectors and mining company personnel with office researches, mineral identification, and field problems, talked to Junior Rangers, and worked on four special projects which are more fully described below.

By the end of November, 319 people had visited the office.

GOLD STUDY EAST OF WANAPITEI LAKE by W. Meyer

This started out as a thin section study early in 1985 on altered rock from a drill program in Scadding Township. The drilling was carried out by Arthurian Resources Limited on a 20-claim property optioned from P. Brown of Corbeil, Ontario. The property lies 4 km northwest of the Scadding mine, then operated by Westfield Minerals Limited. The alteration is similar to that at the Scadding mine.

The thin section work produced few results, and during spring and summer, the study expanded into a regional reconnaissance east of Wanapitei Lake to gain a better understanding of the distribution of the alteration, its geometry in relationship to the host rocks, and the relationship to gold mineralization. The problem became more intractable as time went on, and work will continue in 1986. The following observations can be made:

1. A fine-grained pink alteration is widespread east of Wanapitei Lake. It also occurs north and south of the lake, but is less common there. It is not known if the alteration occurs on the western side of the lake, and thus right around it.

   The pink alteration was seen to affect all Huronian formations from Bruce to Lorrain, and Nipissing Diabase. Thin section work and field relationships suggest that it is a metasomatic change from incipient to complete replacement. Bedding and crossbedding may be well preserved, and ghost pebbles can be seen in altered Bruce Formation paraconglomerates.

The alteration consists of a quartz-albite mosaic, with grains mostly in the low micron range. Analyses from the Scadding mine (Martins *et al.* 1979; D.G. Innes, Quinterra Resources Incorporated, personal communication, 1985) suggest soda metasomatism, but the analyses were not compared with analyses of unaltered and stratigraphically equivalent rocks. Flag Resources Limited analyzed several samples from Rathbun Township, and obtained between 8% and 12% Na_2O (R. Goad, Consulting Geologist, personal communication, 1985).

The geometry of the alteration is difficult to pin down. Between the Scadding mine and Wanapitei Lake it lies along the Espanola-Serpent Formations contact, so that it appears stratabound for 6 km. However, it pinches and swells from nothing to perhaps 150 m thick, so that on a smaller scale it rapidly crosscuts bedding. One possible explanation is that solutions rose along steeply dipping faults or breccia pipes, and spread laterally along the Espanola-Serpent Formations contact. Elsewhere, the alteration occurs in irregular masses several hundred metres across, or as dike-like features.

East of Wanapitei Lake, the alteration affects Sudbury Breccia, and is cut by olivine diabase dikes. The age of the alteration is therefore most likely to be between 1.85 Ga and 1.2 Ga. Martins *et al.* (1979) and Harper (1983) thought that the alteration relates to Nipissing Diabase, i.e. is about 2.16 Ga old. Most probably it is younger.

2. An iron rich rusty weathering carbonate often replaces the pink alteration in the form of well developed rhombohedra. These range from microscopic size to crystals 40 mm across. The rhombs may be randomly scattered in the pink rock, or lie along well defined planes, which give the rock a well stratified appearance. In some outcrops, these planes are parallel to regional strike and dip of unaltered rock, and thus probably are bedding planes.

   Carbonate rhombs may be developed in such numbers that they coalesce to form a very coarse, near-massive rock, with only some interstitial pink material remaining. Massive replacement carbonates several metres thick occur. These also occur in brecciated but otherwise unaltered country rock, mostly the Serpent Formation.

   The source of the carbonate appears to have been the Espanola Formation, but the recrystallized carbonate is richer in iron.

3. At the Scadding mine, gold occurs in massive chlorite and pyrite within brecciated pink rock. Where chlorite is developed, carbonate rhombs are scarce. Some chlorite at the mine occurs in well shaped rhombs, thought to be pseudomorphs after carbonate.

   The source of the widespread pink alteration, the reasons for subsequent carbonate recrystallization, the causes of the still later but more localized brecciation, chloritization, pyritization, and gold mineralization, are as yet unknown.

THE TEMAGAMI MAGNETIC ANOMALY by R.W. Campbell

The Temagami magnetic anomaly is a large elliptical feature that occurs between Lake Wanapitei and Lake Temagami. It strikes northeasterly for 58 km and is 19.3 km wide. Totally or partly, it underlies 17 townships. It occurs along a structure which contains several other magnetic anomalies of similar magnitude. This structure trends northeasterly parallel to the Grenville Front and is marked by several major fault zones. To the southwest, the Great Lakes Tectonic zone connects with the Murray Fault zone which connects with the Huronian-Mistassini Fault zone. This same trend appears as a relative gravity high on the Bouguer Gravity Anomaly Map of Canada.

The northeastern part of the anomaly can be attributed to several outcropping wide bands of Archean Algoma-type oxide iron formation. The southwestern part of the anomaly is overlain by thick Huronian sediments, in places >1524 m. Gravity and magnetic interpretations suggest the southwestern part may be caused by an alkali intrusive complex.

The occurrence of eugeosynclinal Archean rocks overlain by Huronian shallow marine sediments implies a paleo-depression. The fact that this paleo-depression lies along a northeasterly trend of similar magnetics, gravity and geology allows for the speculation that the entire trend may have been a depression, possibly representing an ancient rift or subduction zone during Precambrian time.

Drillhole data from the study area indicate a progressive down faulting of the Archean crust from Lake Temagami to Lake Wanapitei. Just west of Lake Wanapitei, windows of Archean greenstone are again noted. This may represent a transverse graben structure into which the Gowganda and Lorrain Formations were deposited. This is also implied by the basinal appearance of the Lorrain Formation northeast of Lake Wanapitei.

The study area is cut by many fault systems. Many of these systems appear to have been active over a long time. The most prominent of these systems strikes approximately N65°W and is generally filled with Keweenawan olivine diabase. Felsic intrusions played a major role along with the faulting in disrupting the continuity of the Archean stratigraphy, making it difficult to extrapolate the Archean under the Proterozoic cover.

Profiles of the magnetics show a general broadening and smoothing of the anomaly from east to west. Drillhole data and geological observation indicate the Archean basement is exposed in the east and is buried by at least 1524 m of Huronian sediments in the west.

At the moment, many possible explanations can be offered for the Temagami magnetic anomaly. The eastern part may be solely related to the iron formations. The central part of the anomaly between Eagle Rock Lake and Rawson Lake Fault may be related to deeply buried iron formation or a deeply buried mafic to ultramafic body or both.

To the west of the Rawson Lake Fault, the gravity survey suggests rocks of density 2.65 to 2.70 t/m

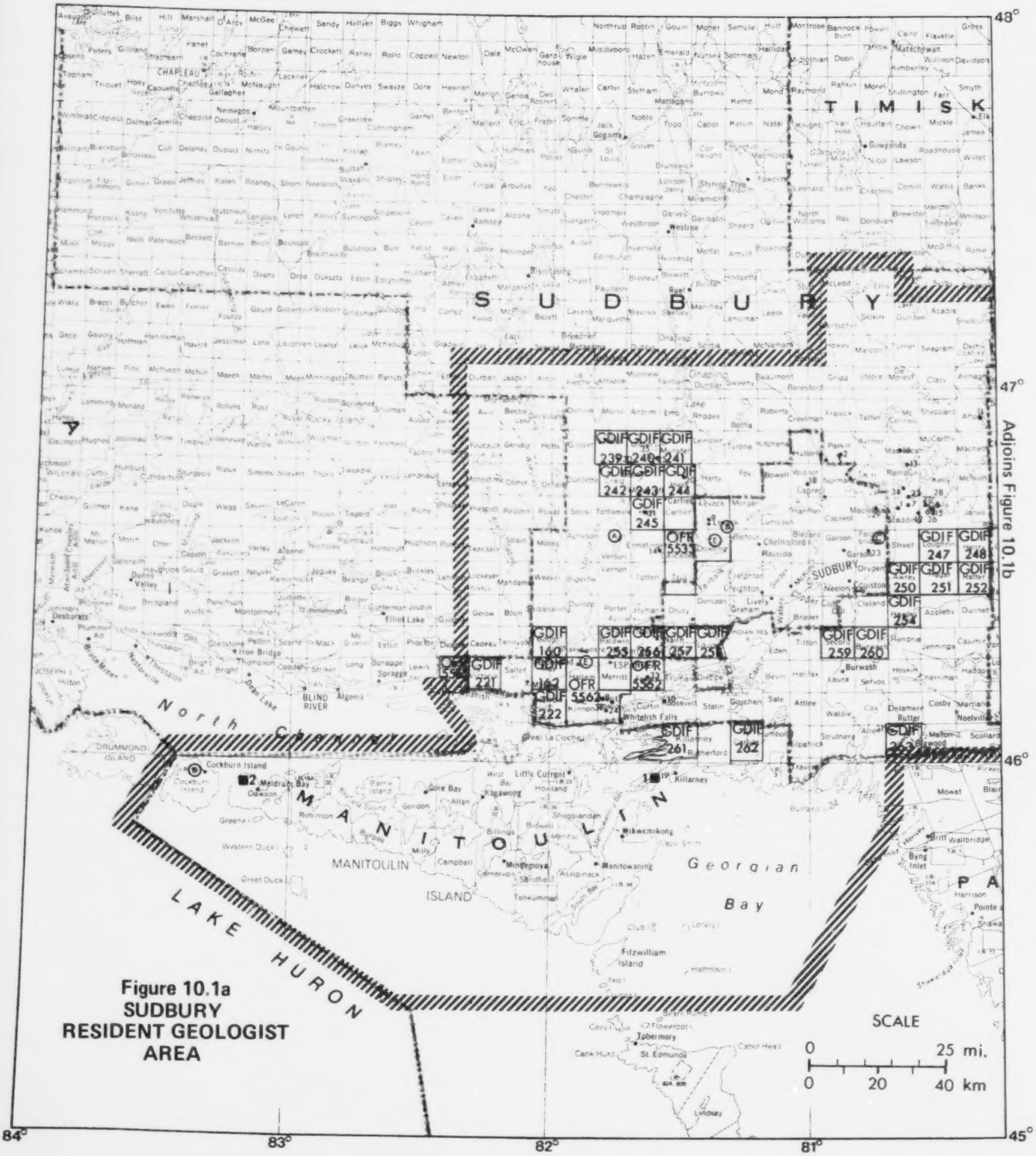
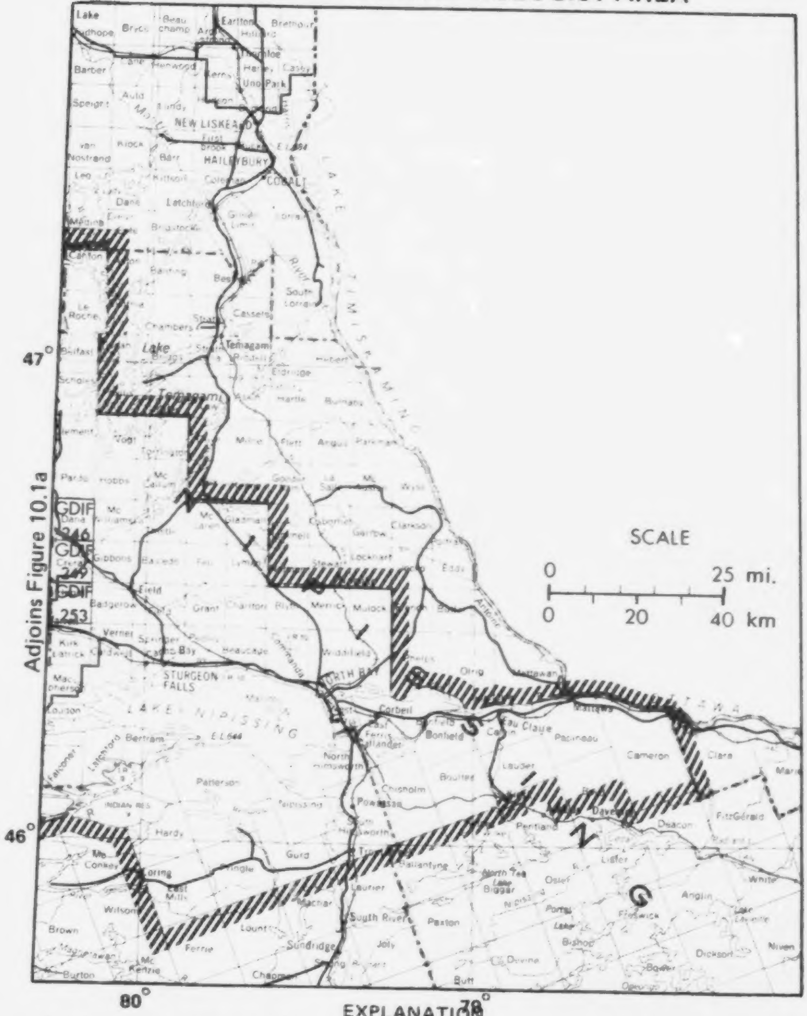

48°
47°
46°
45°
84°
83°
82°
81°
SUDBURY
TIMISK
MANITOULIN
MANITOULIN ISLAND
North Channel
LAKE HURON
Georgian Bay
CHAPLEAU
SUDBURY
BLIND RIVER
DRUMMOND ISLAND
Cockburn Island
Killarney
Little Current
Gore Bay
Tobermory
Fitzwilliam Island
Adjoins Figure 10.1b
GDIF 239
GDIF 240
GDIF 241
GDIF 242
GDIF 243
GDIF 244
GDIF 245
OFR 5533
GDIF 247
GDIF 248
GDIF 250
GDIF 251
GDIF 252
GDIF 254
GDIF 160
GDIF 162
GDIF 221
GDIF 222
GDIF 255
GDIF 256
GDIF 257
GDIF 258
OFR 5562
OFR 5582
GDIF 259
GDIF 260
GDIF 261
GDIF 262
SCALE
0
25 mi.
0
20
40 km

Figure 10.1a
SUDBURY
RESIDENT GEOLOGIST
AREA

Figure 10.1b
SUDBURY RESIDENT GEOLOGIST AREA


Adjoins Figure 10.1a
47°
46°
80°
79°
SCALE
0
25 mi.
0
20
40 km
GDIF 246
GDIF 249
GDIF 253
NEW LISKEARD
HAILEYBURY
COBALT
Temagami
Lake Temagami
NORTH BAY
STURGEON FALLS
LAKE NIPISSING
Mattawa
Callander
Corbeil
Bonfield
Powassan
South River
Sundridge
TIMISKAMING
NIPISSING

EXPLANATION

•7 Exploration Activity, 1985
keyed to TABLE

Ⓐ Location of OGS field party, 1985

A. S. Marmont
B. P. Brockmeyer and R. Lakomey
C. B. O. Dressler
D. R. R. Wolf
E. G. Jones

■ Producing Quarries

1. Indusmin Ltd. . . . . .silica
2. Manitoulin Dolomite Ltd.. dolomite

☐ Map or Report Issued by the OGS, 1985

GDIF – Geological Data Inventory Folio
OFR – Open File Report

▨ Boundary of Resident Geologist's Area

(V.K. Gupta, Geophysicist, Ontario Geological Survey, Toronto, personal communication, 1985). These rocks could be felsic to intermediate intrusions or gneissic rocks. The magnetic survey indicates a possible separate anomaly source over this section of the study area. It is possible that the southwestern end of the Temagami magnetic anomaly is represented by an alkali intrusive complex.

Much more study is required on the area. Planned for this winter is more technical research on similar anomalies and examination of samples taken during the 1985 field season. A more intense field study will be carried out in 1986.

PRECIOUS METAL STUDY: SUDBURY-ESPANOLA AREA by F.H. Toews

In June 1985, a two-year project was initiated to study precious metal occurrences in the Sudbury-Espanola area. The aim of the project is to examine in detail, sample, and interpret known gold prospects and former, small, producing mines found within parts of the Huronian Supergroup.

Upon completion of field and laboratory studies, ideas on the environment, genesis, and exploration prospects for these precious metal occurrences will be forthcoming in an open file report. This, in turn, will assist (and hopefully stimulate) the exploration for precious metal deposits in the area.

During the 1985 field season, properties hosting 14 precious metal (predominantly gold) occurrences were mapped on grid lines at a scale of 1 inch to 100 feet. More than 1000 grab and chip samples were collected to encompass both the vein zones and the surrounding host rocks. A portion of the lithogeochemical samples collected are in the process of being analyzed for both major elements and trace elements (As, Au, Ag, Pt, Pd) by the Geoscience Laboratories, Ontario Geological Survey, Toronto. As well, a number of thin and polished sections are to be prepared for examination. Structural data collected during mapping will also be interpreted.

The properties examined are located in an east-west trending zone extending through McKinnon, Mongowin, Curtin, and Roosevelt Townships (Figure 10.2). Some of the gold occurrences have been known since the early 1900s and the McMillan and Bousquet Mines were small producers in the mid-1930s (Gordon *et al.* 1979).

The gold occurrences are of the vein type, comprising stockwork to quartz breccia to massive quartz with a variable content of carbonate, sulphide minerals, chlorite, and hematite. The veins occur in vertical to steeply dipping metasediments of the Gowganda Formation (quartzites interbedded with pelites and paraconglomerate) and underlying Serpent Formation (quartzites). Some of the gold occurrences (i.e. Evangeline Lake area, lot 12, concession 4, Mongowin Township, McMillan Mine, and possibly the Fox Lake prospects) are found on the southern limb of the Fox Lake Anticline as defined by Robertson *et al.* (1972) and Card (1975). Auriferous veins may also occur at, or near, the contact with Nipissing Diabase and/or amphibolite intrusions (e.g. Bousquet Mine, McMillan Mine, Bob Tough prospect, Howry Creek Mine, Hanwood-Leech Lakes area); in close proximity to the major east-west trending Charlton Lake Faults (e.g. Evangeline Lake area, Howry Creek Mine); and to the northeast-trending Fox Lake and Hardwood Lake Faults (e.g. Fox Lake prospects) as defined by Robertson *et al.* (1972) and Card (1975). Northwest-trending lineaments or faults are also present in the vicinity of most of the gold occurrences. Drag folding of pelitic rocks appears to be associated with auriferous quartz veins at the McMillan Mine (Rickaby 1936).

Commonly, the environment surrounding the quartz veining shows the effects of carbonatization and silicification which occur in both the metasediments and the mafic intrusions. Sulphide minerals (arsenopyrite, pyrite, and/or pyrrhotite), hematite, and chlorite can also be found in the wall rocks.

The one prospect examined which contains platinum group elements (PGE) is located in central Curtin Township. This occurrence is hosted by a steeply dipping, east-west trending, sill-like body of Nipissing Diabase which is intrusive into, and grossly conformable to, the enclosing interbedded quartzites, pelites, and conglomerates of the Gowganda Formation. Locally, the Diabase contacts crosscut stratigraphic contacts of the metasediments; show brecciation and stoping of the metasediments; and, along part of the northern margin, the buried (fault?) contact is bounded by a 60 m wide, northwest-trending zone of brecciated quartzites, pelites, and conglomerate impregnated by quartz veining and by Sudbury-type breccia. Gabbroic fragments are present locally in the breccia veins and amphibolite dikes are also present in the gabbro body at this prospect. In places, pyrrhotite, chalcopyrite, and/or pyrite occurs disseminated and chalcopyrite as fracture fillings in the gabbro.

Sulphide minerals can occur in both the unsheared and the sheared zones which may be accompanied by silicification and carbonatization. PGE and gold are associated with the sulphide minerals (Assessment Files, Resident Geologist's Office, Ministry of Northern Development and Mines, Sudbury).

GEOLOGICAL DATA INVENTORY FOLIOS (GDIFs) by R. Adlington

By the end of 1984, 51 GDIFs had been published and 2 more completed. In 1985, 29 GDIFs were published and 5 more completed.

Many visitors to the Sudbury office are unaware of GDIFs and their usefulness.

A GDIF is useful to mineral exploration companies, individual prospectors, mineral collectors, and anyone interested in mining history because it provides a summary of Assessment Work Files and mineral deposits information.

The data are compiled on a township by township basis. All data are plotted, and then correlated, on a township map at the same scale as a claim map. Property locations are plotted on a separate map at the same scale.

Text pages (forms) summarize additional information which, where applicable, is cross-referenced to the two maps.

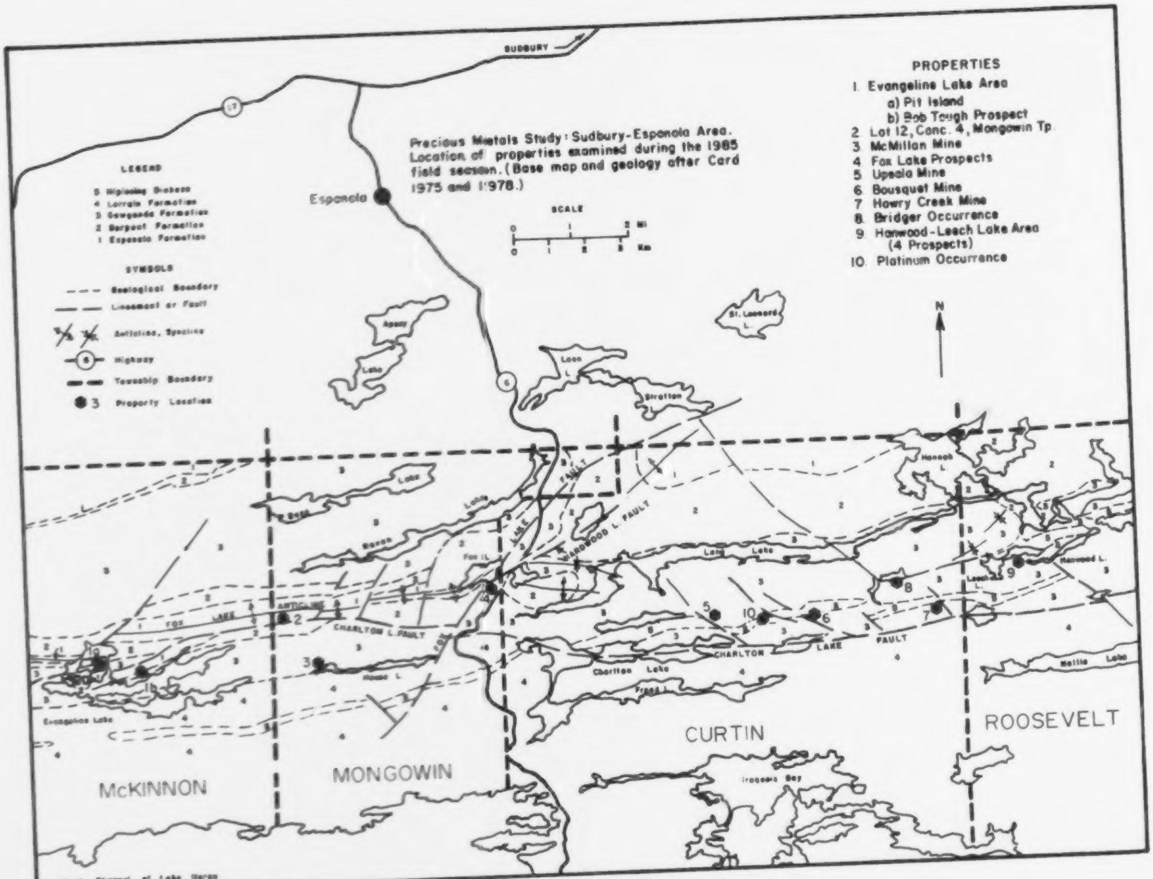

SUDBURY
17
Precious Metals Study: Sudbury-Espanola Area. Location of properties examined during the 1985 field season. (Base map and geology after Card 1975 and 1978.)
PROPERTIES
1. Evangeline Lake Area
a) Pit Island
b) Bob Tough Prospect
2. Lot 12, Conc. 4, Mongowin Tp
3. McMillan Mine
4. Fox Lake Prospects
5. Upsala Mine
6. Bousquet Mine
7. Howry Creek Mine
8. Bridger Occurrence
9. Harwood-Leach Lake Area (4 Prospects)
10. Platinum Occurrence
LEGEND
5 Nipissing Diabase
4 Lorrain Formation
3 Gowganda Formation
2 Serpent Formation
1 Espanola Formation
SYMBOLS
Geological Boundary
Lineament or Fault
Anticline, Syncline
Highway
Township Boundary
Property Location
Espanola
SCALE
0 1 2 Mi
0 1 2 3 Km
N
St. Leonard L.
Loon L.
Stratton
Hannah L.
Harwood L.
FAULT
HARWOOD L. FAULT
FOX LAKE
ANTICLINE
CHARLTON L. FAULT
CHARLTON LAKE FAULT
Charlton Lake
Evangeline Lake
McKINNON
MONGOWIN
CURTIN
ROOSEVELT
Iroquois Bay
Nellie Lake
North Channel of Lake Huron

Figure 10.2. Precious metals study : Sudbury - Espanola Area

A GDIF has several advantages. It saves time and work when searching for data in a township, particularly about an individual company or property.

All information is summarized, compiled, and correlated.

The person searching can locate the area of interest quickly and, if more detail is required, can go directly to the sources of information.

A glance at the data map shows areas of high interest and reported assessment data.

The GDIF is easily up-dated and reissued.

MINING ACTIVITY

Nickel-copper-precious metal mining by Inco Limited and Falconbridge Limited continued to dominate mining in the area. Other commodities produced are silica, dolomite, sand, and gravel. Three old mines are being reopened to assess if they are viable gold producers.

NICKEL-COPPER-PRECIOUS METALS

Inco Limited operated nine underground mines, two open pits, three mills, one smelter, two refineries, and a metal strip plant for coinage blanks. Falconbridge Limited operated six underground mines, two mills, one small open pit, and one smelter in the area (Figure 10.3).

Both companies were profitable for the first nine months of 1985 but continuing low copper prices and the sliding nickel price from US $2.58 in the second quarter to below US $2.00 in the last quarter is causing concern. Both companies announced further staff cuts.

GOLD

Three companies looked at three small idle gold mines to see if these can be reopened.

The Scadding mine in Scadding Township remained closed in 1985. In 1984, it produced 3525 ounces (109.6 kg) of gold from 24 000 tons of ore from three small open pits. An underground orebody has not been developed.

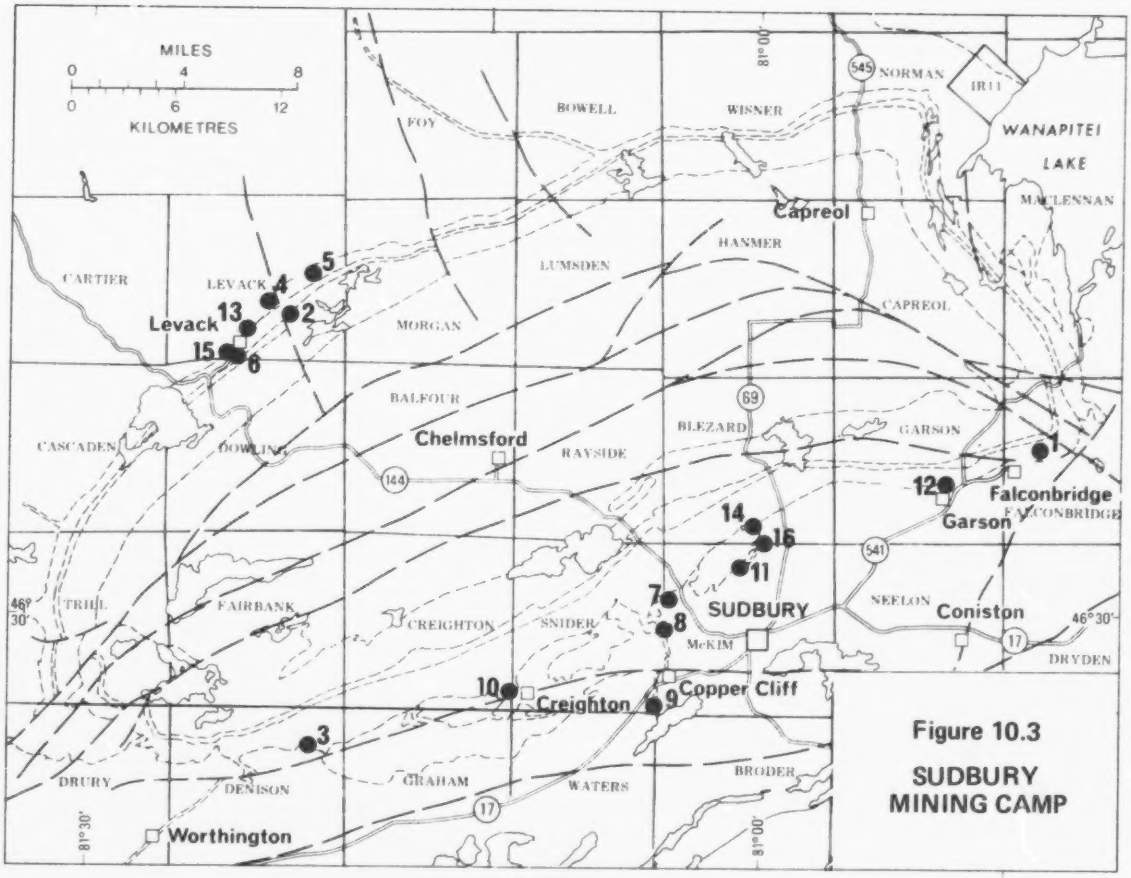

MILES
0
4
8
0
6
12
KILOMETRES
81°00'
FOY
BOWELL
WISNER
545
NORMAN
IR11
WANAPITEI
LAKE
MACLENNAN
Capreol
HANMER
CARTIER
LEVACK
LUMSDEN
CAPREOL
5
4
13
2
Levack
15
6
MORGAN
BALFOUR
69
BLEZARD
GARSON
CASCADEN
DOWLING
Chelmsford
RAYSIDE
144
1
12
Falconbridge
Garson
FALCONBRIDGE
14
16
11
541
46°
30'
TRILL
FAIRBANK
7
8
SUDBURY
NEELON
Coniston
46°30'
CREIGHTON
SNIDER
McKIM
17
DRYDEN
10
Creighton
9
Copper Cliff
3
DRURY
DENISON
GRAHAM
WATERS
BRODER
17
81°30'
Worthington
81°00'

Figure 10.3

SUDBURY MINING CAMP

EXPLANATION

Producing Mines, 1985

Falconbridge Ltd. . . . . Co Ni, Cu, Pt, Au, Ag

1. East Mine
2. Fraser Mine
3. Lockerby Mine
4. North Mine
5. Strathcona Mine
6. Onaping Mine

Inco Ltd. . . . . . Ni, Cu, Pt, Sc, Te, Co, Au, Ag, Fe

7. Clarabelle Open Pit
8. Copper Cliff North Mine
9. Copper Cliff South Mine
10. Creighton Mine
11. Frood Mine
12. Garson Mine
13. Levack Mine
14. Little Stobie Mine
15. McCreedy West Mine
16. Stobie Mine

During the year, Orofino Resources Limited gained control of the mine from Westfield Minerals Limited. Orofino Resources Limited entered into a 50:50 joint venture with Groundstar Resources Limited to drive a 1500-foot (457 m) decline to explore gold-copper mineralization on the Norstar property in Davis Township, 9 km east of the Scadding mine. Work on the portal started in October.

Previous owners reported 80 000 tons of 0.2 ounce gold per ton (6.88 g/t) and 0.86% copper. If mineable reserves are found, ore will be trucked to the 200-ton per day mill at the Scadding mine. Orofino Resources Limited will manage the program.

Emerald Lake Resources Incorporated reported proven and probable reserves of 1 926 500 tons of 0.204 ounce gold per ton (6.34 g/t) in the Golden Rose Mine in Afton Township, and more than 1 million tons of possible reserves.

In November and December, the company dewatered the upper levels to extract a bulk sample for metallurgical testing.

Loki Resources Incorporated gained control of the old McMillan Gold Mine in Mongowin Township from Hemlar Resource Explorations Limited. The mine has a 650-foot (198 m) shaft, an internal winze, and 7 levels to 875 feet (267 m). During the 1930s, 10 593 ounces of gold (329.5 kg) were won from 60 139 tons of ore. Reserves are estimated to be 500 000 tons grading 0.18 ounce gold per ton (6.2 g/t) to the fifth level at 600 feet (183 m).

By the end of November, Loki Resources Incorporated had dewatered the mine to the fifth level, and was preparing to systematically sample the mine.

INDUSTRIAL MINERALS

Indusmin Limited reported 460 000 tons of silica produced from their Badgely Island quarry in Georgian Bay. Silica is being quarried from orthoquartzites of the Bar River Formation.

Manitoulin Dolomite Limited continued to quarry dolostone of the Amabel Formation from the western end of Manitoulin Island. Production figures were not available.

Warren Industrial Feldspar Company Limited continued its examination of a building stone prospect in Henry Township, 50 km east-northeast of Sudbury. Test samples have been polished and examined. At the moment, the company is conducting a market study and looking into using black anorthosite as curbing.

Canadian Unique Granites Limited is examining a building stone prospect in the southeastern corner of Goschen Township, 43 km south of Sudbury. They are examining a pink feldspar porphyry with a dark matrix, and an equigranular pink granite. The prospect has had favourable reports from a consulting firm and at the moment is being drilled to determine horizontal sheeting.

A few areas are being looked at close to Sudbury for use as silica flux.

EXPLORATION ACTIVITIES

Low metal prices took their toll, and claim staking decreased by one third. Between January 1 and November 30, 1985, 920 claims were staked, as compared to 1373 in the same period of the year before.

Figure 10.4 compares staking activity from 1973 to the end of 1985.

The most active search areas were for gold north and east of Wanapitei Lake, and for base metals northwest of Sudbury. Assessment Work filed in 1985 is listed in Table 10.1 and Exploration activity is summarized in Table 10.2. Some of the properties visited, and highlights known to this office are as follows:

Noranda Exploration Company Limited, the major ground holder in the Benny Greenstone Belt, contracted a detailed airborne survey of their claim group last spring. During the field season, they followed up with reconnaissance geological, geochemical, and geophysical surveys.

Federal Kirkland Mines Limited and Stralak Resources Incorporated continued to drill their multizone zinc-lead deposit in Craig Township. Preston East Dome Mines Limited in 1952 had outlined 363 680 tons grading 3.18% zinc, 0.32% copper, and 0.68 ounce silver per ton over an average width of 2.5 m to a depth of 47 m. Values as high as 22% zinc were encountered in the east zone. Federal Kirkland Mines Limited and Stralak Resources Incorporated have outlined approximately 750 000 tons proven or inferred ore ranging from 6 to 17 feet wide grading 3 to 22% zinc, 2 to 12 ounces silver per ton, 0.5% lead, and 0.5% copper (The Northern Miner, July 11, 1985). Both the old east zone and the new east zone are open. Drilling is scheduled to continue in early 1986 (D. Constable, Consulting Geologist, personal communication, 1985).

Hecla Mining Company has the Wolf Lake gold property in MacKelcan Township under option from Flag Resources Limited. This property had been drilled intensively in the years before. In early 1985, Hecla Mining Company added five holes, drilled from ice on the lake. The full core length of the program is not known. One vertical hole drilled to 1067 feet (325 m) and bottomed in altered Lorrain Formation arkoses. The breccia zone appears to be wide and deep under the lake. The Northern Miner reported results on the first three holes. One section assayed 0.7 ounce gold per ton (24 g/t) over 1 foot (30.48 cm), and several 10 to 15 foot (3 to 4.5 m) sections grading between 0.105 and 0.166 ounce gold per ton (3.6 to 5.7 g/t). Hecla Mining Company plans further drilling in 1986.

In early summer, Flag Resources Limited stripped, trenched, mapped, and diamond drilled a complex breccia and alteration zone on the southeastern shore of Boot Lake in Rathbun Township. The exposed part of the zone is about 300 m long and 120 m wide, with the long axis trending north-northeast. The breccia and alteration look similar to that of the East-West Zone at the Scadding mine.

In late summer, Flag Resources Limited discovered a linear dike-like pink alteration zone in

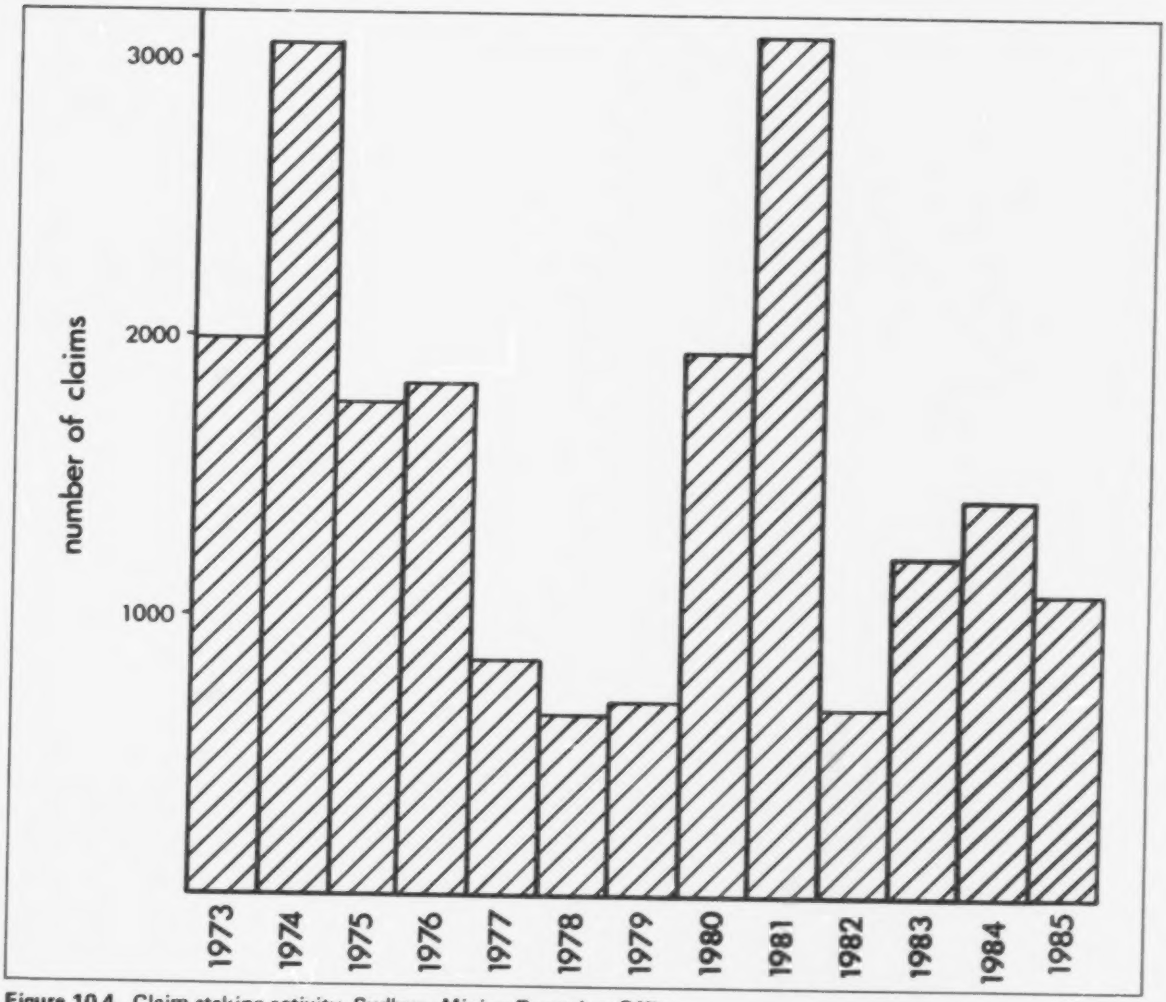


Figure 10.4 . Claim staking activity, Sudbury Mining Recorders Office.

Gowganda Formation sediments in Rathbun Township. The zone is up to 40 m wide, and can be followed for about 1700 m in a northwesterly direction from near the old Mondoux mine. The structure was mapped and sampled. Surface samples assayed up to 0.3 ounce gold per ton (10.3 g/t). Flag Resources Limited drilled five angle holes into the zone. The best assay value reported is 1.7 g Au/t over 1 m.

Jedburgh Resources Limited holds 127 unpatented claims in Hart Township. Huronian outliers here contain zinc, silver, cobalt, and magnetite mineralization in Espanola Formation limestones. Two zones are known. In 1985, Jedburgh Resources Limited carried out soil sampling, VLF and magnetometer surveys, trenching, mapping, and diamond drilled 1515 m in 26 holes. Zinc values of up to 4% in mineralized sections of up to 3 m wide were encountered.

W. Klenk continued to work on old oil wells in the Pike Lake and Manitouwaning areas of Manitoulin Island to see if additional oil can be recovered. Klenk had government support under the NORDEV program.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

Publications released in 1985 by the Ontario Geological Survey that relate to the area are listed in Table 10.3.

PRECAMBRIAN GEOLOGY PROGRAMS

C. Marmont and five assistants mapped Venturi and Tofflemire Townships, and the northern half of Vernon Township. These townships form part of a large unmapped area 60 km west of Sudbury.

P. Bröckmeyer and R. Lakomey, students from the University of Muenster, Federal Republic of Germany, worked on Footwall Breccia and the basal Onaping Formation in Dowling, Levack, and Morgan Townships.

B.O. Dressler continued mapping in Falconbridge and Street Townships.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 10.1

Number on Figure	Individual or Company	Activity
1	Arthurian Resources Limited	Analytical, gold prospect Scadding Township
2	Barry, Harold V.	Manual work and trenching, Parkin Township
3	Berry Resources and L. Accord Resources Incorporated	Airborne VLF-EM and magnetics survey, Davis Township
4	Blue, Peter G.	Analytical, Shakespeare Township
5	Brady, John	Manual work, power stripping and diamond drilling, Parkin Township
6	Brady, Marie	Manual work, Davis Township
7	Brown, Philip, A. R.	Airborne VLF-EM and magnetics survey, Scadding Township
8	Brunne, Dan A.	Manual work, trenching and analytical, Mongowin & McKinnon Townships
9	Cluff, G. H.	Diamond drilling, Levack Township
10	Elliot, Art and Campbell, Gordon	Geophysical & geological surveys, manual work and assaying, Roosevelt & Curtin Townships
11	Emerald Lake Resources Incorporated	Dewatering, diamond drilling, mapping, stripping, and analytical work at the New Golden Rose gold mine, Afton Township
12	Evergreen International	Airborne geophysics, Scadding & Davis Townships
13	Flag Resources Limited	Airborne VLF-EM and magnetics, Rathbun & Mackelcan Townships Diamond drilling, gold prospect, Rathbun Township
14	Green, Robert	Diamond drilling, Ematinger Township
15	Guiding Resources Limited	Manual work and power stripping, gold prospect, Davis Township
16	Hecla Mining Company of Canada	Geology, sampling, assaying and diamond drilling, gold prospect Mackelcan Township
17	Hunter, Bob; Couturer, Roger; and Brown, Joe	Magnetics survey, Mongowin Township
18	INCO Limited	Diamond drilling and magnetics survey, Wisner Township
19	Indusmin Limited	Diamond drilling, Killarney Township
20	Jasperson, John K.	Analytical, Hess Township
21	Jedburgh Resources	Geological, geophysical and geochemical surveys and diamond drilling base metal prospect, Hart Township. VLF-EM survey, Sweeny Township.
22	Jerome, Albert E., Jr.	Airborne VLF-EM and magnetics survey, Rathbun & Scadding Townships
23	Jerome, E. and Charron, R.	Airborne VLF-EM and magnetics survey, Falconbridge Township
24	Loki Resources Incorporated	Dewatering and sampling, MacMillian Mine, Mongowin Township
25	Noranda Exploration Company Limited	Airborne VLF-EM and magnetics survey, ground geological, geophysical and geochemical surveys, Craig, Stralak, Hess, Moncrieff and Munster Townships.
26	Orofino Resources Limited and Groundstar Resources Limited	Driving a ramp at the old Norstar Mine, Davis Township
27	Plexman, Eric J.	Diamond drilling, stripping and manual work, Davis Township
28	Premier Explorations Incorporated	Geological and electro-magnetic surveys, Davis Township
29	Sheppard, Thomas	Geological and geophysical surveys, manual work and power stripping, MacLellan Township
30	Stralak Resources and Federal Kirkland Mines	Diamond drilling, Craig Township
31	Steep Rock Resources Limited	Diamond Drilling, Bigwood Township
32	Stringer Exploration Limited	VLF-EM survey, diamond drilling and power stripping, Mongowin Township
33	Sulpetro Minerals Limited	Diamond drilling and assaying, Foster Township
34	Viitala, Reino L.	Diamond drilling, Rathbun Township
35	Wright, R. J.	Electro-magnetic and magnetic surveys, Moncrieff & Ulster Townships

TABLE 10.2

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Dryden, Street, Awrey	41/I/7/10	New Arcadia Explorations Ltd.		Assess	GL	1984	2.7540	#0020-A1
Aylmer, Mackelcan	41/I/15	Sheppard, Thomas		Assess	Tr	1984		#0018-A1
Sale, Bevin	41/I/3	Sulpetro Minerals Ltd.		Assess	GL	1984	2.7005	#0010-B1
Goschen, Sale, Caen, Stalin	41/I/3	Lac Minerals Ltd.		Assess	AEM, A Mag, VLF	1983	2.6687	#0012
Craig, Ulster, Moncrieff, Stralak	41/I/13	Stralak Resources Inc.	Au, Ag, Cu, Pb, Zn	Assess	DDH	1984		#0025
Craig	41/I/13	Stralak Resources Inc.	Au, Cu, Zn	Assess	DDH	1984		#0024-A1
Curtin, Roosevelt	41/I/3/4	Elliot Exploration		Assess	DDH	1984		#0022-A1
Ermatinger	41/I/12	Green, R.		Assess	DDH	1984		#0014-A1
Eden	41/I/6	Luke Lake Ltd.	Au, As, Cu, Ni	Assess	Geochem, DDH, SA	1983	2.5782	#0020
Dunlop	41/I/5	Rio Algom Exp. Inc.	Au, As, Cu, Ag	Assess	DDH, SA	1983		#0011
Street, Awrey, Dryden	41/I/7/10	New Arcadia Exploration Ltd.		Assess	GL	1984	2.7540	#0020-A1
Davis	41/I/9/10	Leschishin, E.		Assess	Mag, EM	1983	2.6581	#0052-A1
Davis	41/I/9/10	Leschishin, E.		Assess	Mag, EM	1983	2.6580	#0050-A1
Davis	41/I/9/10	Bradvan Mining Co.		Assess	Mag	1982		#0052-C1
Davis	41/I/9/10	Tomasini, M.	Cu, Pb, An	Assess	Soil Geochem	1982	2.6426	#0051-A1
Davis	41/I/9/10	Guiding Resources Ltd.	Au	Assess	DDH	1984		#0053-A1
Davis	41/I/9/10	Tomasini, M.	Au, Ag, Cu Ni, Zn, Cu	Assess	SA	1983	2.6233	#0050-C1
Davis	41/I/9/10	Palkovits, Mike; Falconer, J. D.; Palkovits, R.		Assess	Mag, EM	1984	2.7261	#0054
Foster	41/I/4/5	Sulpetro Minerals Ltd.	Au, Cu, Mo W, Au, Zn	Assess	DDH, SA	1984		#0027
Foster	41/I/4/5	Sulpetro Minerals Ltd.	Au, W	Assess	DDH	1985		#0028
Fraleck	41/I/15	Brady, John		Assess	Tr & Stripping Work Report	1984		#0013-A1
Goschen	41/I/3	Lac Minerals Ltd.		Assess	GL	1983	2.6006	
Levack	41/I/11	Falconbridge Ltd.		Assess	DDH	1983		#0016-A1
Levack	41/I/11	Northgate Resources Ltd.	Cu	Assess	GL, Geochem (Soil)	1983	2.7278	#0017
Levack	41/I/11	Penman, J. D.		Assess	Mag, EM, GL	1984	2.6883	#0u18
Aylmer, Mackelcan	41/I/15	Sheppard, T.		Assess	Mag	1983	2.5975	#0018-B1
Aylmer, Mackelcan	41/I/15	Sheppard, T.		Assess	Tr	1984		#0018-A1
Mackelcan, Rathbun	41/I/15	Flag Resources	Au	Assess Assess	DDH, SA Wolf Lake Project	1983 1984		#0021
Mackelan, Rathbun	41/I/15	Flag Resources	Au, Cu	Assess	GL, DDH, SA	1982		#0022
Mackelan	41/I/15	Hecla Mining of Canada Ltd.	Au	Assess Assess	DDH SA	1983 1984		#0023

TABLE 10.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Maclennan	41/I/10	Sheppard, Thomas	Au, Ag, Co, Ni	Assess	SA	1982	2.6987	#0027-A1
Maclennan	41/I/10	Sheppard, Thomas	Ag, Au, Co, Cu,Ni	Assess	SA	1983	2.6591	#0028-A1
Maclennan	41/I/10	Sheppard, Thomas	Ag, Au,Co	Assess	SA	1982	2.6536	#0028-C1
McKinnon	41/I/4	Maurex Resources Inc		Assess	VLF-EM report	1984	2.7539	#0016
Roosevelt	41/I/3/4	Grant, J. W.-Grant, J. R.		Assess	Mag , EM-VLF	1984	2.6596	#0016
Sale	41/I/3	Komarechka, Robert G.		Assess	GL	1984	2.7088	#0010-A1
Rathbun	41/I/10/15	Viitala, Reins L.		Assess	DDH	1984		#0028-C1
Rathbun	41/I/10/15	New Augarita Porcupine Mines Ltd.		Assess	DDH	1984		#0029
Rathbun	41/I/10/15	Viitala, R. L.	Au, Pt	Assess	DDH	1984		#0036
Rathbun	41/I/10/15	New Augarita Porcupine Mines Ltd.		Assess	EM	1984	2.7148	#0031
Rathbun	41/I/10/15	New Augarita Porcupine Mines Ltd.	Au, Ni,Pt	Assess	Tr, DDH, SA	1984	2.7367	#0035
Rathbun	41/I/10/15	New Augarita Porcupine Mines Ltd.	Au, Ni,Pt	Assess	DDH	1983		#0028-A1
Rathbun	41/I/10/15	Viitala, Reino L.		Assess	Mag	1983	2.6138	#0033-A1
Rathbun	41/I/10/15	New Augarita Porcupine Mines Ltd.	Au	Assess	DDH, SA	1984		#0034
Scadding	41/I/10	Haultain Resources Inc.		Assess	A Mag, AEM, VLF	1984	2.7796	#0044
Scadding	41/I/10	Arthurian Resources Inc.	Au	Assess	DDH, SA	1984		#0042
Scadding	41/I/10	Ontario Ltd.		Assess	AEM, VLF-EM, Mag	1984	2.7792	#0043
Scadding	41/I/10	Brown, P. A. R.		Assess	Mag, EM, GL	1984	2.6621	#0034
Scadding	41/I/10	Brown, P. A. R.		Assess	Mag, EM	1984	2,6774	#0035
Norman	41/I/15	Jaatinin, I.	Au, Ag, Cu, Pb,Zn	Assess	SA	1984	2.7382	#0025-A1
Parkin	41/I/15	Brady, John		Assess	EM, Mag	1984	2.7122	#0037
Parkin	41/I/15	Brady, John		Assess	Tr, Stripping	1984		#0041-B1
Parkin	41/I/15	Brady, John		Assess	Tr, Stripping	1984		#0041-D1
Parkin	41/I/15	Larson, Rodolf		Assess	Tr	1984		#0040-E1
Parkin	41/I/15	Brady, John		Assess	Tr, Stripping	1984		#0041-C1
Parkin	41/I/15	Nearctic Resources Inc.		Assess	DDH	1983		#0035-C1
Parkin	41/I/15	Canadian Nickel Co. Ltd.		Assess	DDH	1984		#0038-A1
Scadding	41/I/10	Haultain Resources Inc.	Au, Cu	Assess	Mag, EM, SA	1983	2.5685	#0039
Scadding	41/I/10	Arthurian Resources	Au, Cu	Assess	Mag, EM, GL	1984	2.6622	#0037
Scadding	41/I/10	Southgate Resources Ltd.		Assess	Mag, EM, GL	1983	2.5892	#0038
Scadding	41/I/10	Brown, P. A. R.		Assess	Mag, EM	1984	2.6411	#0033
Shakespeare	41/I/5	Blue, P. G.	Au	Assess	SA	1983	2.6319	#0037-A1
Shakespeare	41/I/5	Blue, P. G.	Au	Assess	Tr, SA	1982		#0037-C1
Street	41/I/10	Watt, D. R., McLean, P. C.		Assess	DDH	1983		#0012
Street	41/I/10	Watt, D. R., McLean, P. C.	Au	Assess	GL, SA	1984	2.7060	#0014
Street	41/I/10	Watt, D. R., McLean, P. C.	Au, Ag	Assess	GL-Property Report, SA	1983		#0016
Street	41/I/10	Brown, P. A. R., Graham, J. R.		Assess	Mag, EM, GL	1983	2.6466	#0015-A1
Ulster	41/I/13	Stralak Resources Inc.	Zn, Pb	Assess	DDH	1984		#0012-A1
Kelly	41/I/9/10/15/16	Southgate Resources Inc.	Au, Ag, Cu Pb	Assess	Mag, EM, SP	1984	2.6732	#0015
Alymer, Mackelcan	41/I/15	Ateba Mines Inc.		Assess	A Mag, EM, GL	1981		#0017
McKinnon	41/I/4	Maurex Resources Ltd	Au	Assess	GL, SA	1984	2.7087	#0015
Rathbun	41/I/10/15	New Augarita Porcupine Mines Ltd.	Au	Assess	DDH, SA	1984		#0034
Rathbun	41/I/10/15	Viitala, Reino L.		Assess	Mag	1983	2.6138	#0033-A1
Scadding	41/I/10	Ateba Mines Inc.	Au	Assess	Mag, EM, Humus, Geochem	1981	2.5552	#0040
Scadding	41/I/10	Lee, J.		Assess	Stripping	1983		#0030-E1
Shakespeare	41/I/5	Watt, D. R., McLean, P. C.	Au, Ag	Assess	GL, SA	1983		#0016

TABLE 10.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Shakespeare	41/I/5	Blue, P. G.		Assess	Manual Labour	1984		#0036-B1
Scadding	41/I/10	Abeta Mines Inc.		Assess	Mag, EM, GL	1983	2.5946	#0031
Street	41/I/10	Watt, D. R., McLean, P. C.	Au, Ag, Cu	Assess	GL, SA	1982		#0013
Davis	41/I/9/10	Tomasini, Michael A.		Assess	SA	1983	2.6233	#0051-A1
Davis	41/I/9/10	Tomasini, Michael A.		Assess	Geochem, Resistivity	1983	2.6426	#0051-A1
Davis	41/I/9/10	Leschishin, Edward		Assess	Power Stripping	1983		#0055-A1
Kitchener	41/I/14	Leschishin, Olga		Assess	Power Stripping	1983		#0013-A1
Parkin	41/I/15	Leschishin, Olga		Assess	Compressed Air	1983		#0042-D1
Maclennan	41/I/10	Sheppard, Thomas		Assess	Power STr, Tr	1983		#0029-A1
Maclennan	41/I/10	Sheppard, Thomas		Assess	Power STr, Tr	1985		#0029-A1
Parkin	41/I/15	Leschishin, Edward		Assess	Compressed Air, Tr	1983		#0042-A1
Parkin	41/I/15	Leschishin, Edward		Assess	Tr, Compressed Air	1983		#0042-B1
Parkin	41/I/15	Miron, Theodore		Assess	Tr	1983		#0042-E1
Scadding	41/I/10	Butler, R. C.		Assess	Shaft Sinking	1983		#0046-A1
Mongowin, McKinnon	41/I/4	Brunne, Dan A.		Assess	Manual Work	1985		#0023-A1
Bigwood	41/I/2	Steep Rock Resources		Assess	DD	1985		#0012-A1
Curtin	41/I/4	Elliot, A. T.		Assess	Geophys	1985	2.8447	#0023-A1
Davis	41/I/9/10	Accord Resources Inc Berry Resources Inc.		Assess	A Mag, EM, VLF	1985		#0055-C1
Davis	41/I/9/10	Flexman, Eric		Assess	DD, CS	1985		#0056-A1
Davis	41/I/9/10	Brady, Marie, Van Lith, George		Assess	Manual Work	1985		#0056-D1
Davis	41/I/9/10	Brady, Marie, Van Lith, George		Assess	Compressed Air	1985		#0056-E1
Davis	41/I/9/10	Guiding Resources Inc.	Au	Assess	Power STr, Manual Work, Compressed Air	1985		#0057-A1
Davis	41/I/9/10	Pelangio-Larder Mines, Premier Exp. Inc., Asbury, B.		Assess	EM	1985	2.8429	#0057-B1
Davis	41/I/9/10	Premier Exp. Inc.		Assess	GL	1985	2,8582	#0058-A1
Davis	41/I/9/10	Brady, Marie, Van Lith, George		Assess	Manual Work	1985		#0058-C1
Falconbridge	41/I/10	Jerome, E., Charron, R.		Assess	A Mag, AEM, VLF	1985	2.8472	#0037-A1
Foster	41/I/4/5	Sulpetro Minerals Ltd.	W	Assess	DD	1983		#0029
Foster	41/I/4/5	Sulpetro Minerals Ltd.	W	Assess	Benification of Assays	1985	2.8209	#0030
Foster	41/I/4/5	Sulpetro Minerals Ltd.	W	Assess	GL Mapping, SA	1983		#0031
Hart	41/I/12	Jedburgh Resources	Zn, Pb	Assess	Geochem, SA	1985	2.7871	#0015
Henry	41/I/9	Leblanc, Albert		Assess	DD	1985		#0012-A1
Hess	41/I/12/14	Jasperson, John		Assess	Tech. SA Survey	1985	2.7854	#0027-A1
Kelly	41/I/9/10/15/16	Robinson, Randy C.		Assess	GL	1984	2.8069	#0016
Killarney	41/I/3	Indusmin Ltd.	SiO_2	Assess	DD	1985		#0014-A1
Mackelcan	41/I/15	Flag Resources Ltd.	Au	Assess	Summary Report	1984		#0024
Maclellan	41/I/10	Sheppard, Thomas		Assess	GL, Feasability Study	1983	2.8477	#0029-C1
Mongowin	41/I/4	Stringer Expl. Ltd.	Au	Assess	GP-VLF, EM	1985	2.8020	#0023-B1
Mongowin	41/I4	Stringer Expl. Ltd.	Au	Assess	Power STr	1985		#0024-A1
Parkin	41/I/15	Brady, John		Assess	SA	1983	2.7885	#0043-B1
Parkin	41/I/15	Brady, John		Assess	Summary of Work	1985		#0043-E1
Parkin	41/I/15	Barry, Harold V.		Assess	Manual Work	1985		#0044-A1
Davis	41/I/9/10	Brady, Marie, Van Lith, George		Assess	Tr-Summary	1983		#0056-B1
Rathbun	41/I/10/15	Viitala, Reino L.		Assess	DD	1984		#0037
Roosevelt	41/I/4	Elliot, Art	Ag	Assess	Rock SA	1985	2.8427	#0019-A1
Scadding	41/I/10	New Arcadia Explorations Inc.		Assess	Summary of Work	1983		#0045
Scadding	41/I/10	Haultin Resources Inc.		Assess	Geophys	1985	2.7906	#0046-B1
Scadding	41/I/10	Haultin Resources Inc.		Assess	Summary	1983		#0047

TABLE 10.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Scadding	41/I/10	Arthurian Resources Inc.	Au	Assess	Analytical, Geochem, Geophys	1985	2.7785	#0048
Scadding	41/I/10	Evergreen International		Assess	A Geophys	1985	2.8409	#0049
Scadding	41/I/10	Westfield Minerals Ltd.	Au	Assess	DD, Geology of North Shore	1984		#0050
Scadding	41/I/10	Brown, P. A. R., Graham, R. J.		Assess	A Mag, VLF, EM	1985	2.8548	#0051
Shakespeare	41/I/5	Blue, Peter		Assess	SA	1985	2.8184	#0038-A1
Wisner	41/I/10/ 11/14/15	INCO		Assess	Geophys-Mag	1985	2.8029	#0012
Wisner	41/I/10/ 11/14/15	INCO		Assess	DD	1985		#0013-A1
Parkin	41/I/15	Brady, John		Assess	Manual Work	1985		
Davis	41/I/9/10	Brady, Marie		Assess	Compressed Air	1984		
Roosevelt	41/I/3/4	Elliot, A./Campbell, Gordon		Assess	Mag, SP	1985		
Scadding	41/I/10	Davidson, W. T.		Assess	EM-16, VLF	1984		
Roosevelt	41/I/3/4	Elliot, A. T.		Assess	GL	1985		
Curtin	41/I/4	Elliot, Art		Assess	Manual Work	1985		
Curtin/Roosevelt	41/I/3/4	Elliot, Art		Assess	Rock SA	1985		
Roosevelt	41/I/3/4	Elliot, Art		Assess	Mag, SP	1984		
Levack	41/I/11	Cluff, G. H.		Assess	DD	1985		
Mackelcan	41/I/15	Flag Resources Ltd.	Au	Assess	A Mag, EM	1985		
Scadding	41/I/10	Graham, R. J.		Assess	A Mag, VLF, EM	1984		
Roosevelt	41/I/3/4	Grant, Jerry W.		Assess	Mag, VLF, EM	1984	2.8548	
Ematinger	41/I/12	Green, Robert		Assess	DD, CS	1985		
Davis	41/I/9/10	Guiding Resources Ltd.	Au	Assess	Manual Work	1985		
Davis	41/I/9/10	Guiding Resources Ltd.	Au	Assess	Power STr	1985		
Mongowin	41/I/4	Hunter, B., Couturer, R, Brown, Joe		Assess	Fluxgate Mag	1984		
Wisner	41/I/10/ 11/14/15	INCO Limited		Assess	Geophys, Mag	1985	2.8029	
Killarney	41/I/3	Indusmin Limited		Assess	DD	1985		
Sweeny	41/I/3	Jedburgh Resources Ltd.		Assess	EM	1984		
Hart	41/I/12	Jedburgh Res. Ltd.	Pb, Zn	Assess	Geochem	1985		
Sweeny	41/I/3	Jedburgh Res. Ltd.		Assess	VLF, EM	1984		
Hart	41/I/12	Jedburgh Res. Ltd.	Pb, Zn	Assess	Mag	1985		
Hart	41/I/12	Jedburgh Res. Ltd.	Pb, Zn	Assess	Geochem, Mag, VLF, EM	1985		
Hart	41/I/12	Jedburgh Res. Ltd.	Pb, Zn	Assess	Power STr	1985		
Hart	41/I/12	Jedburgh Res. Ltd.	Pb, Zn	Assess	GL	1985		
Hart	41/I/12	Jedburgh Res. Ltd.	Pb, Zn	Assess	Geochem	1984		
Rathbun	41/I/10/15	Jerome, A. E., Jr.		Assess	A Mag/EM	1985		
Rathbun	41/I/10/15	Jerome, A. E., Jr.		Assess	A Mag/EM	1985		
Rathbun/Scadding	41/I/10/15	Jerome, A. E., Jr.		Assess	A Mag/EM	1985		
Rathbun/Scadding	41/I/10/15	Jerome, A. E., Jr.		Assess	A Mag/EM	1985		
Rathbun/Scadding	41/I/19/15	Jerome, Edward		Assess	A Mag/EM	1985		
Hager	41/I/7/8/ 9/10	Larson, Rlidolf		Assess	Power STr, DD	1985		
Kitchener	41/I/14	Leschishin, Olga		Assess	Manual Work	1983		
Lundy	Cobalt	Morgan, K. A.		Assess	EM, VLF	1985		
Craig, Stralak, Hess, Moncrieff, Munster	41/I/13	Noranda Exploration Company Ltd.	Pb, Zn	Assess	Geophys A Mag, EM	1985		
Levack	41/I/11	Northgate Exp. Ltd.		Assess	GL	1984		
Davis	41/I/9/10	Premier Exp. Inc.		Assess	GL	1985		
Davis	41/I/9/10	Plexman, Eric J.		Assess	Compressed Air, Manual Work	1985		
Maclennan	41/I/10	Sheppard, Thomas		Assess	Microscopic Sur.	1982-83		
Maclennan	41/I/10	Sheppard, Thomas		Assess	GL, Rad, VLF	1985		
Maclennan	41/I/10	Sheppard, Thomas		Assess	GL	1985		
Maclennan	41/I/10	Sheppard, Thomas		Assess	Plane Table Sur.	1985		
Maclennan	41/I/10	Sheppard, Thomas		Assess	Manual Work	1985		

TABLE 10.2 Continued

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Maclennan	41/I/10	Sheppard, Thomas		Assess	Geohphys, EM	1982-83		
Mongowin	41/I/4	Stringer Exp. Ltd.	Au	Assess	DD	1985		
Foster	41/I/4/5	Sulpetro Minerals Ltd.	W	Assess	DD	1985		
Foster	41/I/4/5	Sulpetro Minerals Ltd.	W	Assess	DD	1985		
Rathbun	41/I/10/15	Viitala, Reino L.		Assess	DD	1985		
Moncrieff/Ulster	41/I/13	Wright, R. J.	Zn, Pb	Assess	Geophys, EM, Mag	1985		
Parkin	41/I/15	Barry, Harold V.		Assess	Manual Work	1985		
Parkin	41/I/15	Barry, Harold V.		Assess	Compressed Air Gas Pluggers	1985		
Parkin	41/I/15	Brady, John		Assess	Power STr	1985		
Parkin	41/I/15	Brady, John		Assess	Power STr	1985		
Parkin	41/I/15	Brady, John		Assess	DD	1985		
Davis	41/I/9/10	Brady, Marie		Assess	Manual Work	1985		
Mackelcan, Rathbun	41/I/15	Flag Resources (1985) Limited	Au	Assess	A	1985		
Rathbun	41/I/10/15	Flag Resources (1985) Limited	Au	Assess	DD	1985		
Mackelcan	41/I/15	Hecla Mining Co. of Canada	Au	Assess	GL Mapping & Sampling, drill core SA	1984		
Mackelcan	41/I/15	Hecla Mining Co. of Canada	Au	Assess	DD	1985		
Hart	41/I/12	Jedburgh Res. Ltd.	Zn, Pb	Assess	DD	1985		
Maclennan	41/I/10	Sheppard, Thomas		Assess	GL	1985		
Mackelcan	41/I/15	Flag Resources Ltd.		Assess	1983 DD Program	1984		
Parkin	41/I/15	Barry, Harold V.		Assess	Compressed Air Tr	1985		
Parkin	41/I/15	Barry, Harold V.		Assess	Compressed Air, Pluggers	1985		
Parkin	41/I/15	Barry, Harold V.		Assess	Manual Work	1985		
Foucault/Monestine	41/J/16	Crossan, Patrick		Assess	Manual Work	1985		
Foucault/Monestine	41/J/16	Crossan, Patrick		Assess	DD	1985		
Foster	41/J/4	Naples, Ken		Assess	Geochem SA	1985		

ENGINEERING AND TERRAIN GEOLOGY PROGRAMS

R.R. Wolf mapped Cockburn Island in Lake Huron. A stratigraphic drillhole to 521 m augmented surface data. Precambrian basement was intersected at 483 m.

G. Jones and assistants carried out aggregate resources inventories northwest of Sudbury, and west of Espanola.

GEOPHYSICS/GEOCHEMISTRY PROGRAMS

V.K. Gupta used aeromagnetics to interpret depth to basement and the distribution of Nipissing Diabase in the Cobalt Plate.

ONTARIO MINERAL EXPLORATION PROGRAM (OMEP)

Eleven OMEP agreements were in force for all or part of 1985. Planned total expenditures were to have been $2,727,750. If all this money is spent, OMEP will reimburse $582,936 of this.

ONTARIO GEOSCIENCE RESEARCH PROGRAM

Three projects, funded by the Ontario Geoscience Research Grants Program, lie wholly or partly within the area of the Sudbury Resident Geologist.

A.J. Naldrett, B.V. Rao, N.M. Evensen, and B.O. Dressler worked on the Sudbury Structure; D.J. Wright and B.R. Rust studied stratigraphy and sedimentology of the Bar River Formation, Huronian Supergroup; and D.M. Canrod and A.J. Naldrett studied petrology, geochemistry, isotopes, and PGE potential of Nipissing Diabase.

CORE LIBRARY

Sudbury is still without a core storage facility. During the year, Hecla Mining Company donated core from their 1985 Wolf Lake gold drilling program (complete and condensed); Jedburgh Resources Limited from their Hart Township base-metal drilling program (complete and condensed); and Flag Resources Limited from their Boot Lake gold drilling program in Rathbun Township (condensed).

The complete core is temporarily stored at McFarlane Lake, and the condensed sections are temporarily stored in the Resident Geologist's office.

TABLE 10.3 MAPS AND REPORTS PERTAINING TO THE SUDBURY RESIDENT GEOLOGIST AREA PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports

OFR 5533	Geology of the Cascaden, Dowling, Levack and Trill Townships
OFR 5565	Oilshale Assessment Project Drillholes for Regional Correlation 1983/84
OFR 5562	Aggregate Resources Hallam, McKinnon, Mongowin and Foster Townships, Sudbury District and Shedden Township, Algoma District

Geological Data Inventory Folios

GDIF 160	Gough Township
GDIF 162	May Township
GDIF 221	Victoria Township
GDIF 222	Harrow Township
GDIF 239	Stralak Township
GDIF 240	Ulster Township
GDIF 241	Munster Township
GDIF 242	Craig Township
GDIF 243	Moncrieff Township
GDIF 244	Hess Township
GDIF 245	Hart Township
GDIF 246	Dana Township
GDIF 247	Loughrin Township
GDIF 248	Henry Township
GDIF 249	Crerar Township
GDIF 250	Awrey Township
GDIF 251	Hagar Township
GDIF 252	Ratter Township
GDIF 253	Hugel Township
GDIF 254	Hawley Township
GDIF 255	Baldwin Township
GDIF 256	Nairn Township
GDIF 257	Lorne Township
GDIF 258	Louise Township
GDIF 259	Secord Township
GDIF 260	Burwash Township
GDIF 261	Killarney W Part
GDIF 262	Carlyle Township
GDIF 263	Bigwood Township

Geophysical/Geochemical Series

Map 80-756	Geochemical Series; Preliminary Studies of Lake Sediment Geochemistry in an area Northeast of Sudbury

Branch Publications

Map 126	Summary of Field Work and Other Activities, 1985
Map 127	Geoscience Research Grant Program Summary of Research 1984-1985

RECENT PUBLICATIONS

Buchan, K.L., and Card, K.D.
1985: Preliminary Comparison of the Petrographic and Paleomagnetic Characteristics of Nipissing Diabase Intrusions in Northeastern Ontario; p.131-140 *in* Current Research, Part A, Geological Survey of Canada, Paper 85-1A.

Cabri, F.J., Blank, H., ElGoresy, A., Laflamme, J.H.G., Nobiling, R., Sizgoric, M.B., and Traxel, K.
1984: Quantitative Trace-Element Analyses of Sulphides from Sudbury and Stillwater; Canadian Mineralogist, Volume 22, Part 4.

Davidson, A., Nadeau, L., Grant, S.M., and Pryer, L.L.
1985: Studies in the Grenville Province of Ontario; p.463-483 *in* Current Research, Part A, Geological Survey of Canada, Paper 85-1A.

Duke, J.M.
1985: An Overview of the Sudbury-Timmins Algoma-Mineral Program (STAMP), Ontario; p.723-725 *in* Current Research, Part A, Geological Survey of Canada, Paper 85-1A.

James, R.S., and Born, P.
1985: Geology and Geochemistry of the East Bull Lake Intrusion, District Algoma, Ontario; Canadian Journal of Earth Sciences, Volume 22, p.968-979.

Kamineni, D.C., McCrank, G.F., Stone, D., Ejeckam, R.B., and Sikorsky, R.
1985: A Preliminary Report of Alteration and Fracture-filling Mineralogy in the East Bull Lake Pluton, District of Algoma, Ontario; p.81-88 *in* Current Research, Part B, Geological Survey of Canada, Paper 85-1B.

Pearson, W.N., Bretzlaff, R.E., and Carriere, J.J.
1985: Copper Deposits and Occurrences in the North Shore Region of Lake Huron, Ontario; Geological Survey of Canada, Paper 83-28.

Wright, D.J.
1985: Preliminary Report on the Stratigraphy and Sedimentology of the Huronian Bar River Formation, Ontario; p.111-116 *in* Current Research, Part B, Geological Survey of Canada, Paper 85-1B.

Young, G.M., and Nesbitt, H.W.
1985: The Gowganda Formation in the Southern Part of the Huronian Outcrop Belt, Ontario, Canada: Stratigraphy, Depositional Environments and Regional Tectonics, Precambrian Research 29.

REFERENCES

Card, K.D.
1975: Mongowin and Curtin Townships, Sudbury District; Ontario Division Mines, Coloured Map 2312, Geological Series, scale 1 inch to 1/2 mile. Geology 1966 and 1968.
1978: Geology of the Sudbury-Manitoulin Area, Districts of Sudbury and Manitoulin; Ontario Geological Survey, Report 166, 238p. Accompanied by Map 2360, scale 1 inch to 2 miles (1:126 720) and 4 charts.

Gordan, J.B., Lovell, H.L., de Grijs, Jan, and Davie, G.F.
1979: Gold Deposits of Ontario, Part 2: Part of District of Cochrane, Districts of Muskoka, Nipissing, Parry Sound, Sudbury, Timiskaming and Counties of Southern Ontario; Ontario Geological Survey, Mineral Deposits Circular 18, 253p.

Harper, G.
1983: The Geology of the Scadding Gold Deposits; Paper presented at 1983 Sudbury Mineral Kaleidoscope.

Martins, J.M., Horst, R.E., and Giblin, P.E.
1980: Report of Sudbury Resident Geologist; p.103-116 *in* Annual Report of the Regional and Resident Geologists, 1979, edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 91, 143p.

Rickaby, H.C.
1936: Notes on Mongowin Township and Vicinity; Ontario Department Mines, Annual Report for 1935, Volume 44, Part 7, p.57-61.

Robertson, J.A., Siemiatkowska, K.M., and Cape, D.F.
1972: McKinnon Township and Adjacent Islands, Districts of Sudbury and Manitoulin; Ontario Division Mines, Preliminary Map P.794, Geological Series, scale 1 inch to 1/4 mile. Geology 1972.

11. Huntsville Resident Geologist Area, Algonquin Region

David J. Villard[1] **and Mary Garland**[2]

[1] Resident Geologist, Ontario Ministry of Northern Development and Mines, Huntsville

[2] Geologist, Ontario Ministry of Northern Development and Mines, Huntsville

INTRODUCTION

Permanent staff in the Huntsville Resident Geologist's office consist of Jack van der Meer, Mineral Resources Coordinator, David Villard, Resident Geologist, and Kathy Martin, Secretary. Mary Garland continued on a long-term contract, and worked mainly on mineral characterization studies. The boundary between the Bancroft Resident and the Huntsville Resident Geologist was adjusted to be more reflective of geology.

Exploration activity increased during 1985, and was related mainly to work carried out on two graphite properties. Besides graphite, interest was shown in gold, base metals, stone, rare earths, gemstones, and silica. Claim staking was at its highest level in several years.

RESIDENT GEOLOGIST'S ACTIVITIES

The Algonquin Region, for mineral management purposes, is divided into two areas of responsibility. The Huntsville Resident Geologist is responsible for the northwestern half of the Region as shown on Figure 11.1. In 1985, the boundary between the Huntsville Resident and the Bancroft Resident was adjusted to be more reflective of geology. The Huntsville Resident is now responsible for that part of the Central Gneiss Belt lying within the Algonquin Region.

As in previous years, much of the Resident's time was spent on consultative duties, with requests for information or assistance coming from prospectors, exploration people, and the general public. The year 1985 showed a modest increase in the number of public inquiries. Graphite, silica, gold, copper, and stone were the commodities for which information was most requested. All of the active properties, as well as many inactive areas, were visited at least once during the year.

Mary Garland continued her study of the graphite potential of the Central Gneiss Belt, as well as initiating a study of the stone potential of the same area. The graphite study is almost completed and a report should be published early in 1986. Her work on stone was limited to an inventorying (field and office) of the known "stone" occurrences within the Central Gneiss Belt.

Two out-of-Province trips were organized during 1985, both directly related to the "stone" project. Three days were spent in the Quebec City-Eastern Townships area with L'Association des Producteurs de Granite du Québec Inc. Several "granite" quarries and finishing plants were visited, enabling geological staff to develop a good understanding of the building stone industry in Quebec. A trip was also made to the state of Vermont, where various marble and granite operations were examined.

In 1985, a joint project was undertaken with the Eastern Region, Ministry of Natural Resources, to develop an overview of the building stone potential of the Grenville Province. Several months of well conducted field work were devoted to the Central Gneiss Belt, and several interesting areas, deserving additional work, were outlined by C. Verschuren and C. Papertzian, of the Tweed Resident Geologist's office. The Huntsville office will continue this work in 1986.

A project to computerize most of the geological data in the Huntsville office was initiated, with the purpose to provide a better service to the exploration industry, and better utilization of data internally. The system is expected to be fully operational in 1986.

GRAPHITE PROJECT

All field work has been completed on this project, as well as basic thin section work and preliminary chemistry. A detailed study of the graphite flake is currently in progress. The graphite was separated by flotation and magnetic separation methods, and then sieved. Flake finer than 100 mesh is not used. The graphite will be analyzed by neutron activation, Isotrace, ICP, SCEM, and reflecting light microscope. Preliminary neutron activation work was done in the summer to check the feasibility of this method, and will be followed by more runs during the winter. A major problem with sample homogeneity and purity was encountered. The nature of the graphite flake traps quartz and feldspar grains between the layers, and these grains can be very difficult to remove. Comparative work on Isotrace, the ICP mass spectrometer, and the SCEM, will yield data to determine which method is most suitable to use. The results of the work on flake graphite and the deposits will be published as an open file report in the spring of 1986.

COMPUTERIZATION OF MINERAL AND GEOLOGICAL DATA

A study was initiated that will result in the computerization of most of the geological and mineral deposit information in the Huntsville office. R. Dubien, the systems officer in the Algonquin Region, is completing a program to utilize d-Base III on an IBM-PC. This program should allow for the easy and efficient retrieval of data, the manipulation of data and possibly using the system to help the prospector and exploration geologist in their search for viable mineral deposits. It is hoped to have this system fully operational, with most data on board, by April 1, 1986.

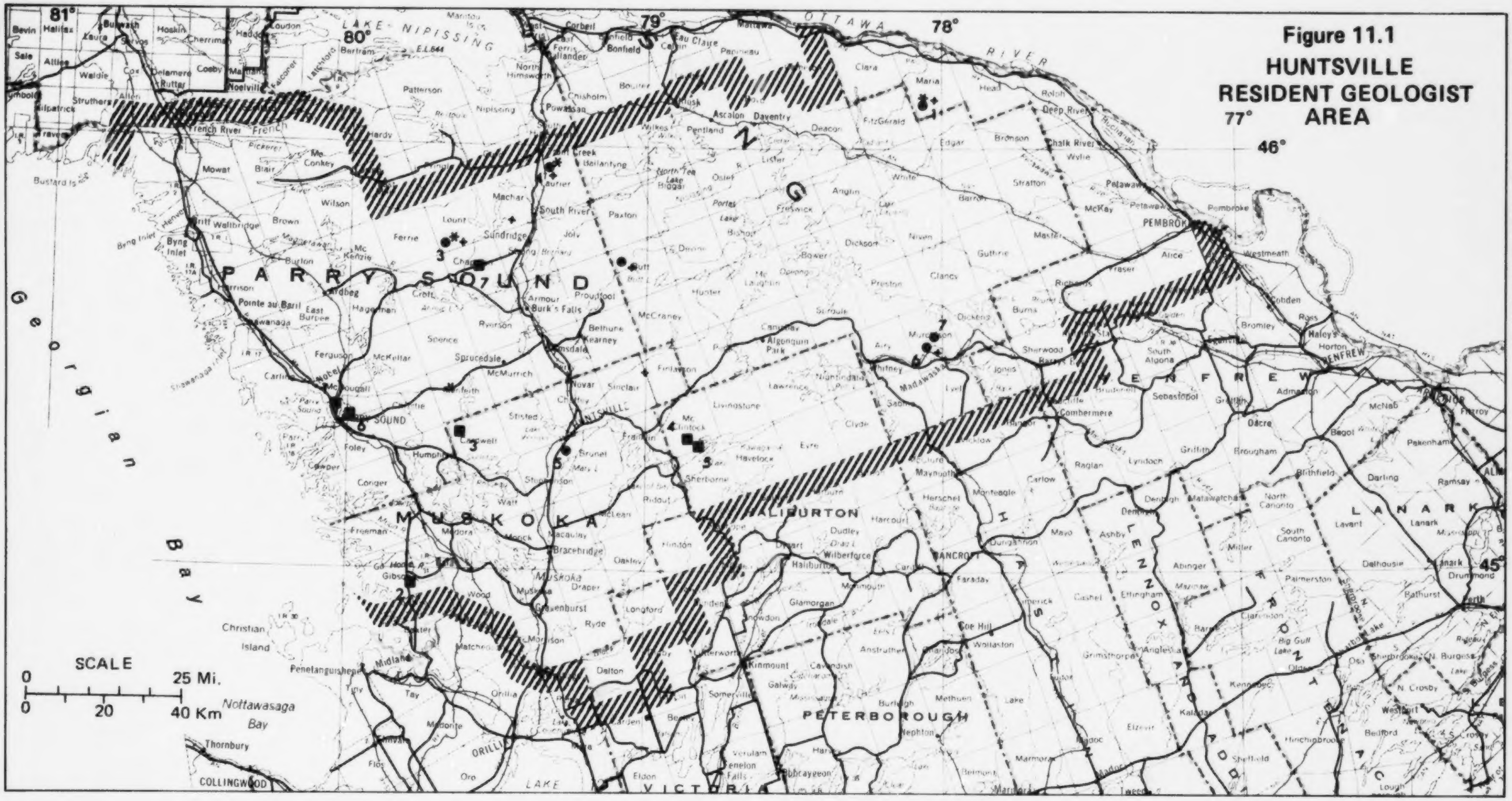


Figure 11.1
HUNTSVILLE
RESIDENT GEOLOGIST
AREA
81°
80°
79°
78°
77°
46°
45°
LAKE NIPISSING
OTTAWA RIVER
PARRY SOUND
NIPISSING
MUSKOKA
HALIBURTON
HASTINGS
RENFREW
LANARK
LENNOX AND ADDINGTON
FRONTENAC
PETERBOROUGH
VICTORIA
Georgian Bay
Nottawasaga Bay
PEMBROKE
COLLINGWOOD
SCALE
0
25 Mi.
0
20
40 Km

■ Producing Quarries

1. Mill Lake Quarry . . . . building stone
2. M. T. C. . . . . construction aggregate
3. Cardwell Twp. . . . . building stone
4. L. Lock . . . . building stone
5. O. Geldschus . . . . building stone
6. Fowler Construction . . . . construction aggregate
7. Jim Donald . . . . .amazonite

* Assessment Work Filed, 1985 keyed to TABLE

● Exploration Activity, 1985 keyed to TABLE

+ Claim Staking, 1985

▨ Boundary of Resident Geologist's Area

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 11.1

Number on Figure	Individual or Company	Activity
1	Princeton Resources	Diamond drilling, geological mapping, bulk sampling, Maria Township
2	Blanchard, E.	Diamond drilling, bulk sampling, Butt Township
3	Jones, E.	Trenching, diamond drilling, prospecting, Lount Township
4	Langley, Patricia	Diamond drilling, Laurier Township
5	Irving	Trenching, prospecting, Stephenson Township
6	Stickley	Quarry development, Murchison Township
7	Rose, Ed	Quarry permit, Murchison Township

OTHER GEOLOGICAL ACTIVITIES

LESLIE M. FROST NATURAL RESOURCES CENTRE

R. Keevil, Acting Lands and Minerals Specialist at the Frost Centre, reported that over 5000 visitors participated in tours and lectures during 1985. An inventory of potential sites for lapidary stone was carried out; 30 sites were evaluated. Results of this inventory are available for viewing at the Centre. A reconnaissance peatland/wetland inventory was also carried out. The report is under review.

The Centre also helped in the preparation of rock samples for projects carried out in the Huntsville office.

PEAT

A private-land agricultural peat extraction operation commenced in Strong Township during late summer, with approximately 9000 cubic yards stockpiled before freeze-up, for shipping in spring, 1986.

A project, to demonstrate the viability of peat as an energy alternative, was carried out through a tripartite agreement between the District Municipality of Muskoka (proponent), the Ministry of Natural Resources, Algonquin Region (project manager), and Canada Works (Section 38, Ontario Resource Sector Work Program). The product accruing from this project is to be tested at various Ministry of Natural Resources and private sector facilities during the winter of 1986-87. A sod peat extruder was designed and built, and approximately one ton of peat sods was produced before freeze-up.

The District Municipality of Muskoka, the Ministry of Agriculture and Food, the Ontario Government Interministerial Committee on Peat, and the commercial cranberry producers of Muskoka, have met to consider the expansion of cranberry production in the area. The Ontario Geological Survey has provided assistance to this project by supplying peat and peatland inventory data derived from Open File Report 5488, "Peat and Peatland Inventory of the Parry Sound Area".

ONTARIO GEOLOGICAL SURVEY

M.J. Ford of the Engineering and Terrain Geology Section continued work on a guidebook of surficial geological features within Algonquin Provincial Park. Some general information on bedrock geology will also be included.

GEOLOGICAL SURVEY OF CANADA

K. Ford of the Radiation Geophysics Section continued work on the Allan Lake Carbonatite in the northeastern corner of Algonquin Provincial Park. In 1985, two diamond-drill holes of approximately 325 m each were drilled from either side of a small unnamed lake about 2 km east of Allan Lake. The holes were drilled at an angle of 45° underneath the lake. The upper part of each hole consisted of bands of gneiss and carbonate "veins". "Massive carbonatite" was encountered in each hole, corresponding to a downward projection of the lake-shoreline boundary, suggesting that the subcircular lake may be reflective of the pluton's shape.

A. Davidson of the Superior-Grenville Section continued mapping the Grenville Province between Latitudes 45°N and 46°N, concentrating his effort within the interior of Algonquin Provincial Park.

EXPLORATION ACTIVITY

As of December 2, 1985, a total of 123 claims were recorded in the Algonquin Region, a noticeable increase from the 20 recorded in 1984. Claim staking is not necessarily a true indication of exploration activity, as a significant proportion of the land base is patented, where staking is not required.

Exploration activity related to interests in graphite, gold, base metals, rare earths, stone, gemstones, and silica is shown in Figure 11.1, and Tables 11.1 and 11.2.

One of the major drawbacks to exploration in the Algonquin Region is the almost complete lack of a geological data base. Hopefully this will begin to be rectified with the initiation in 1986 of several projects under the Federal-Provincial Minerals Agreement. Proposed work calls for Precambrian mapping in the area northeast of Parry Sound; surficial mapping (incorporating a geochemical component) in the area around and north of, Parry Sound; mineral deposit studies and limited aggregate assessment studies in the Muskoka-Parry Sound areas.

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 11.2

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Parry Sound Dist. Laurier Township	31E/14	Patricia Langley	Graphite	Assess	DD (3-298')	Jan./85	85-22	Laurier 12
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Gold, Copper	Assess	DDH (4-174')	Aug./84		Lount 11
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Gold, Copper	Assess	STr and Tr	Sep./84		Lount 12
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Gold, Copper	Assess	STr and Tr (Mechanical)	Aug./84		Lount 13
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Gold, Copper	Assess	STr and Tr	Sep./85		Lount 14
Parry Sound Dist. Lount Township	31E/12	E.T. Jones	Gold, Copper	Assess	STr and Tr (Mechanical)	Sep./85		Lount 15
Parry Sound Dist. Monteith Township	31E/5	Sally Vihonen	Gold, Base Metals	Assess	EM, Mag and Geol.	Aug.-Nov./84		Monteith '84
Renfrew County Maria Township	31L/1	Hartford Resources	Graphite	Assess	DD (37-7,293')	Dec./84 July-Sep./85		Maria 5

GRAPHITE

Exploration for graphite was active on two properties in 1985. In Maria Township near the northeast corner of Algonquin Provincial Park and in Butt Township, east of Kearney, significant drill programs were carried out to outline reserves.

In Maria Township, 101 holes have been drilled to date. According to a company news release on August 15, 1985, "the exploration and development program will consist of infill drilling in the main ore zone, step out drilling in the adjacent mineralized areas, bulk sampling, and metallurgical testing. In conjunction with the bulk sampling and metallurgical testing, detailed pilot plant work will commence, as well as pit planning, base line environmental studies and infrastructure assessment" (Princeton Resources Corporation News Release, May 7, 1985). By December 1, 1985, most of the planned drilling had been completed, and the site had been prepared for installation of the pilot mill and removal of the bulk sample. The company plans to have the pilot mill operational by January, 1986, testing milled flake and sending flake to potential consumers. A production decision is expected sometime in 1986.

In Butt Township, Erana Mines Limited conducted additional drilling and sampling on the Graphite Lake property. A 225-ton bulk sample has been removed from the property for additional testing.

The extensive exploration carried out on the above described properties is encouraging, since graphite has not been mined in Ontario for many years. Both companies anticipate that their properties will make it to the production decision stage in 1986.

RARE EARTHS

Local area prospectors have become interested in the rare earth content of pegmatite deposits. As a result, a property has been staked for samarium in the northwestern part of the area, and further exploration is expected in 1986.

GOLD

Limited exploration for gold, mainly by local prospectors, continued in the Huntsville-Parry Sound area. Most of the work centres around the possible association of gold with pyrite and chalcopyrite mineralization.

QUARTZ

A zoned pegmatite deposit in Murchison Township underwent minor development work in 1985.

STONE

Some interest for building stone was shown in 1985. Inquiries concentrated on potential sources of red or black "granite" suitable for interior or exterior facing. There was also some interest expressed in flagstone, as there are already several producing quarries within the area.

MINING ACTIVITY

Numerous quarries, most notably the Mill Lake Quarry at Parry Sound, produced flagstone for use primarily as a building stone. The Mill Lake Quarry produces several products, including a very attractive one-half inch flagstone, that is easily installed on interior walls.

An amazonite quarry in Chapman Township, northeast of Magnetawan, was opened up as a commercial mineral collecting site. There is also a substantial deposit of garnets on the property which the owner hopes to develop in 1986 as a mineral collecting site. Tourists are transported to the quarry in a horse and wagon.

MINERAL EDUCATION PROGRAM

During the year, regional geological staff visited four Provincial Parks: Killbear (2 visits), Grundy (2 visits), Arrowhead, and Oastler Lake, to give an introductory talk on minerals and geology, followed by a field trip within the park. Staff also visited two junior ranger camps in the Bracebridge and Parry Sound areas for a day-long session on minerals.

RECOMMENDATIONS

Recommendations for exploration are difficult to make when the geological data base is poor to inadequate. With significant expenditures planned through the Federal-Provincial Minerals Agreement, an improvement in the data base is expected.

Graphite is one commodity that deserves a look because of improved market conditions and a better understanding of the mineral. Although two properties are presently being subjected to substantial work programs, numerous occurrences exist throughout the area, for which little data is known. Reconnaissance and detailed mapping from a structural point of view may be the best means of detecting additional deposits.

Pegmatites should be examined for their rare earth potential, particularly since Precambrian bedrock mapping will be carried out in the area northeast of Parry Sound, under the Federal-Provincial Minerals Agreement.

The marbles northeast of Parry Sound should be examined for refractory minerals.

The potential for "stone" is considered as "unknown to good". In the joint project with the Eastern Region, several interesting areas of red "meta-granite" and dark green "meta-gabbro", requiring a more detailed assessment, were detected. Flagstone is an active local industry which has potential for expansion outside the area.

The potential for mineral collecting, although unknown at this time, will be better evaluated when additional bedrock mapping of the Precambrian is done.

REFERENCES AND RECENT PUBLICATIONS

Davidson, A., Nadeau, L., Grant, S.M., and Pryer, L.L.
1985: Studies in the Grenville Province of Ontario; p.463-483 *in* Current Research, Part A, Geological Survey of Canada, Paper 85-IA.

Villard, David J., and Garland, Mary
1985: Huntsville Resident Geologist Area, Algonquin Region, p.242-246 *in* Report of Activities 1984, Regional and Resident Geologists, edited by C.R. Kustra, Ontario Geological Survey, Miscellaneous Paper 122, 297p.

12. Bancroft Resident Geologist Area, Algonquin Region

Hans D. Meyn

Resident Geologist, Ontario Ministry of Northern Development and Mines, Bancroft

INTRODUCTION

The Bancroft Resident Geologist Office is responsible for the Minden, Bancroft, and Pembroke Districts, which are part of the Algonquin Region of the Ontario Ministry of Northern Development and Mines. The other three districts of the Algonquin Region, Parry Sound, Bracebridge, and Algonquin Park, are the responsibility of D.J. Villard, Resident Geologist, Huntsville.

During 1985, the boundaries of the Resident Geologist, Huntsville, and the Resident Geologist, Bancroft, were realigned on the basis of geology, rather than district boundaries. Thus D.J. Villard is responsible for the Central Gneiss Belt (*see* Report of the Huntsville Resident Geologist, this volume), and H.D. Meyn is responsible for the Central Metasedimentary Belt (Figure 12.1). Since the new boundary was established during the course of the year, some of the information in the tables does not yet accurately reflect the boundary change. Some duplication between this report and that of D.J. Villard will be noted, and some information will be plotted outside the new Resident Geologist's area.

The Bancroft office is staffed by Hans D. Meyn, and Karen Fell, secretary. The drill core library was administered by Harald Wolf, who resigned in September. That position has subsequently been vacant.

RESIDENT GEOLOGIST'S ACTIVITIES

The Resident Geologist devoted some time to familiarization with the geology and mineral deposits of the area. Known, currently inactive, mineral occurrences were visited, and new properties undergoing exploration were visited in the company of the owner or operator. The operating mines were also visited.

The Resident Geologist also participated in several field trips, most of them given by persons doing geological work in the area, either for the provincial or federal governments, or a university.

Mineral collecting (rockhounding) is an important part of the economy of the Bancroft area and the Resident Geologist was involved with the Chamber of Commerce in supporting mineral collecting in the Bancroft area.

As part of that effort, the Ontario Ministry of Natural Resources, Algonquin Region, this year again sponsored a booth at the Bancroft Gemboree and the Wilberforce Rockhound Fair, at which mineral and geologically oriented publications issued by the Ministry were on sale. As in previous years, the Ministry of Natural Resources sponsored D.H. Gorman, Professor of Mineralogy, University of Toronto, at these two events to identify rocks and minerals for the rockhounds.

In addition, the Bancroft office produced an inventory of the known mineral collecting sites in the Algonquin Region. This is a compilation of sites taken from all the guidebooks available to us. This inventory is available to the public for inspection at the libraries of the Resident Geologists in Bancroft and Huntsville, and the Mines Library, Ontario Geological Survey, Toronto. As a follow-up to this project, accurate locations for these sites are currently being plotted, and the status of the land with respect to Crown ownership is being established.

Under a Special Employment Project, two geologists were hired to map the York River area in Dungannon Township. This area is one of the more popular mineral collecting areas, with five sites reasonably close to each other and a good variety of minerals available. The intent of the mapping was to better understand the geological setting and to gain some appreciation of the size of the resource available.

DRILL CORE LIBRARY

The Drill Core Library in Bancroft was opened in the spring of 1984. Until September 1985, under the supervision of Harald Wolf, about 42 000 m of core were collected and filed in the new facility. Another 10 000 m are stored outside awaiting processing. The core now in the library represents 542 drillholes from 23 properties in 16 townships representing copper-nickel-cobalt, iron, zinc, uranium, graphite, nepheline syenite, and quartz mineralization.

Data pertaining to the drill core is stored on a microcomputer. This information includes the company name, company drillhole number, year of completion, township, drillhole length, amount of core stored, and whether assays, chemical analyses, thin sections, or polished sections are available. A number of search programs have been written to manipulate the data, thus making it possible to list all drillholes from a specific area by a certain company name or other criteria.

As the drill core library is situated in the Ontario Ministry of Natural Resources compound at Bancroft, about 100 m from the Resident Geologist office, complete assessment files are kept in the library building. Eventually the documents in the assessment files will be marked to indicate what core or samples are available in the drill core library and how they relate to the assessment files.

As a result of the resignation of the drill core librarian in September, access to the drill core library is by appointment only, through the Resident Geologist, until April or May, 1986.

OTHER GEOLOGICAL ACTIVITY

ALGONQUIN REGION

Leslie M. Frost Natural Resources Centre

J. Stocking, Lands and Minerals Specialist, is currently (November 85) seconded to the Interministerial Committee on Peat, for which he is secretary. R. Keevil is acting Lands and Minerals Specialist during

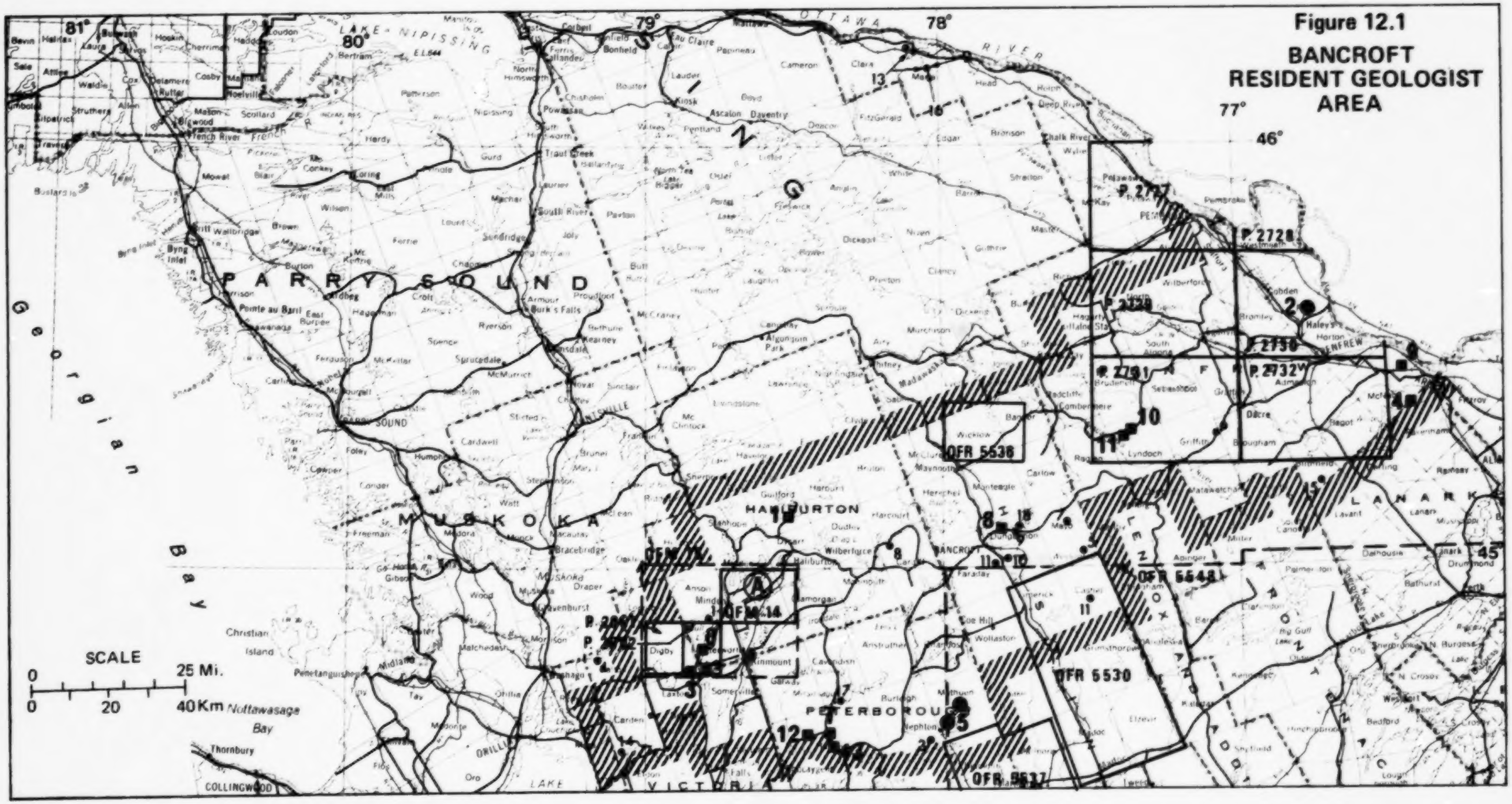

81°
80°
79°
78°
77°
46°
45
LAKE NIPISSING
OTTAWA RIVER
PARRY SOUND
NIPISSING
MUSKOKA
HALIBURTON
PETERBOROUGH
VICTORIA
LENNOX AND ADDINGTON
FRONTENAC
LANARK
RENFREW
BANCROFT
Georgian Bay
Nottawasage Bay
Christian Island
Thornbury
COLLINGWOOD
LAKE
P. 2727
P. 2728
P. 2729
P. 2730
P. 2731
P. 2732
OFR 5536
OFR 5548
OFR 5530
OFR 5537
OFR 5514
A
1
2
3
4
5
6
7
8
9
10
11
12
13
15
16
SCALE
0
25 Mi.
0
20
40 Km

Figure 12.1
BANCROFT RESIDENT GEOLOGIST AREA

- • Exploration Activity, 1985 (keyed to TABLE 12.2)
- ☐ Map or Report issued by the Ontario Geological Survey in 1985 (keyed to TABLE 12.1)
- P Preliminary Map
- ▨ Boundary of Resident Geologist's Area
- ● Producing Mines

2. Chromasco, a division of Timminco Ltd.	Mg, Ca, Sr
5. Indusman, Division of Falconbridge Ltd.	nepheline syenite

Ⓐ Location of OGS Field Party, 1985 Precambrian Mapping. . . . . R. M. Easton

■ Producing Quarries

1. Bolender's Ltd.	crushed dolomite
3. Central Ontario Natural Stone	flagstone
4. Hoffman Concrete Products Ltd.	crushed stone
6. MacDonald	flagstone
7. Ormell Sand and Gravel	flagstone
8. Princess Sodalite Mine	mineral specimens
9. Smith Construction Ltd.	crushed stone
10. Wal-Gem Lapidary	mineral specimens
11. Wal-Gem Lapidary	rose quartz
12. Windover, N.	flagstone
13. Windover, N.	flagstone

TABLE 12.1 MAPS AND REPORTS PERTAINING TO THE BANCROFT RESIDENT GEOLOGIST AREA PUBLISHED DURING 1985 BY THE ONTARIO GEOLOGICAL SURVEY, MINISTRY OF NORTHERN DEVELOPMENT AND MINES.

Open File Reports

OFR 5333 - 1985 edition
OFR 5530
OFR 5536
OFR 5537
OFR 5548

Open File Maps

OFM 14
OFM 15

Preliminary Maps - Geological Series

P.2611
P.2727
P.2728
P.2729
P.2730
P.2731
P.2951
P.2952

Mineral Resources Branch Publications

MPBP 18
MPBP 19
MPBP 20
MPBP 22
Video Census Series No. 4

Miscellaneous Reports

MP 122
MP 125
MP 126
MP 127

Miscellaneous Publication

Price List - 1985 Special Volume 2

the former's absence; J. Etches is currently Mineral Resource Assistant. A. Moore and J. Switzer worked in the Lapidary Room, and J. Hallworth worked on the Peatlands inventory of the Frost Centre.

About 5000 visitors participated in tours and lectures in the mineral resources field. The staff of the Frost Centre gave lectures at two Junior Ranger camps. A reconnaissance peatlands/wetlands inventory of the Frost Centre was completed and submitted to the Ontario Geological Survey for comment. Thirty new sites were evaluated for the lapidary stone inventory, and several samples for the regional building stone project were prepared in the lapidary facility.

ALGONQUIN AND EASTERN REGIONS

C.P. Verschuren (Verschuren 1985), working out of the Tweed office, undertook a survey for building stone potential of the Algonquin and Eastern Regions of the Ministry of Natural Resources.

ONTARIO GEOLOGICAL SURVEY

Maps and reports pertaining to the Bancroft Resident Geologist area and issued by the Ontario Geological Survey are shown in Figure 12.1 and listed in Table 12.1. Additional references to new information of geological interest in the general area are included in the list of selected references. Also shown in Figure 12.1 is the location of the 1985 field work done by the Ontario Geological Survey.

A field party under the leadership of R.M. Easton continued detailed mapping (1:15 840 or 1 inch to 1/4 mile) in the Minden area with the Lochlin Area sheet (Easton 1985). As part of that study, M. Zeeman investigated the building stone potential of certain rocks in that map area (Easton and Zeeman 1985).

J.S. Springer of the Mineral Deposits Section continued her studies of the metallic and industrial minerals in the Grenville Province (Springer 1985).

P.J. Barnett of the Engineering and Terrain Geology Section carried out additional field investigations in the Golden Lake and Pembroke areas in preparation for preliminary Quaternary geology maps, Barnett (1985).

The aggregate assessment group continued field work in Harvey and Belmont Townships in preparation for Aggregate Resource Inventory Papers for these two townships (Ontario Geological Survey 1984a).

GEOLOGICAL SURVEY OF CANADA

W.W. Shilts and associates are continuing their study of the Quaternary deposits of Ontario with respect to their acid rain buffering capacity, their economic potential, suitable prospecting methods therein, and their geological history. As well, a study of glacial erosion of the Canadian Shield is being conducted by C.A. Kaszycki.

A.P. Stenson is continuing her study of mineral collecting in Canada. A new guidebook for the Bancroft area is expected to be released in 1986.

A. Davidson and associates are continuing with the regional synthesis of the Grenville Province in Ontario and Quebec.

S. Hanmer is continuing his studies of structural boundaries in the Grenville Province of Ontario and Quebec.

ROYAL ONTARIO MUSEUM

S.B. Lumbers continued his studies of the northwestern boundary of the Central Metasedimentary Belt in the area east of Haliburton.

Malcolm Back finished a B.Sc. thesis at the University of Toronto on the mineralogy of selected localities in Monmouth and Glamorgan Townships.

EXPLORATION ACTIVITY DURING THE YEAR.

TABLE 12.2

Number on Figure	Individual or Company	Activity
1	Bailey, R.M.	Claim Staking (1), Lutterworth Twp.
2	Belanger, B.P.	Claim Staking (3), Maria Twp.
3	Byer, J.L.	Claim Staking (2), Drilling, Burleigh Twp.
4	Cloughley, R.N.	Claim Staking (2), Dalton Twp.
5	Dubblestein, A.	Claim Staking (2), Power Stripping, Mayo Twp.
6	Ekstrom, R.L.V.	Claim Staking (4), Griffith Twp.
7	Glatrotis, A.C.	Claim Staking (2), Mayo Twp.
8	Hogan, E.T.	Claim Staking (1), Cardiff Twp.
9	Jayfran Enterprises Ltd.	Claim Staking (2), Sampling, Dungannon Twp.
10	Karnuk Marble	Clearing, Stripping, Dungannon Twp.
11	Kretschmar, U.	Claim Staking (4), Cashel Twp. Claim Staking (2), Faraday Twp.
12	Manns, F.T.	Claim Staking (22), Lutterworth Twp.
13	Meikle, R.J.	Claim Staking (32), Maria Twp.
14	Oatway, A.C.	Claim Staking (2), Carden Twp.
15	Pilatzke, N.	Stripping, Trenching, Blithfield Twp.
16	Princeton Resources	Drilling, Stripping, Sampling, Beneficiation Studies, Maria Twp.
17	Richter, D.A.	Claim Staking (3), Cavendish Twp.
18	Schroetter, R.	Claim Staking (1), Dungannon Twp.

UNIVERSITIES

R. Thivierge, University of Ottawa, is completing an M.Sc. thesis on the Centreville-Combermere area.

L. Heaman, McMaster University, Hamilton, is in the process of writing up his Ph.D. thesis on isotopes and trace elements in the Chandos Township area.

Steve Dunn, University of Wisconsin, is continuing a Ph.D. study of stable isotopes of some of the gabbroic bodies of the Bancroft area.

D.M. Burton, University of New Brunswick, completed an M.Sc. thesis on the geology of the Cam uranium deposit, Cardiff Township (Burton 1985).

R.L. Bedell, University of Toronto, completed an M.Sc. thesis entitled "Madawaska Mines, Bancroft, Ontario: Deformation of the Faraday Metagabbro Complex and its Influence on Uraniferous Pegmatite Emplacement and Ore Deposition" (Bedell 1985).

Martin Van Kranendonk, University of Toronto, is studying several anorthosite bodies in the Muskoka District as part of an M.Sc. thesis (Van Kranendonk 1985).

Several Canadian and American universities have annual field trips to the Bancroft area. These are generally at the undergraduate level. The University of Windsor holds their annual field camp just south of Bancroft, and the University of Ottawa holds theirs in the Calabogie area.

EXPLORATION ACTIVITY

The location of properties which were staked and those on which exploration work is known to have been done in 1985 are listed in Table 12.2 and shown in Figure 12.1, keyed to Table 12.2. Assessment work reports received in this office are listed in Table 12.3.

The area saw continuing activity for building stone with staking in Dungannon, Faraday, Cavendish, and Cashel Townships.

Some work was done in Mayo, Cashel, Burleigh, and Griffith Townships on marble deposits for use as either building stone or mineral filler.

Princeton Resources Corporation continued work in Maria Township, where additional staking was done for graphite. Beneficiation studies are underway and a test mill is contemplated.

Sulpetro Minerals Limited continued work at the Renprior/Cadieux zinc property in Admaston Township. Some diamond drilling was done this year.

R.J. Crawford is continuing base-metal exploration on his claims in southwestern Lyndoch Township. Considerable vermiculite was discovered during the course of this work.

Jayfran Enterprises Limited expanded their holdings of nepheline syenite in Dungannon Township and did mapping and sampling.

R.N. Cloughley expanded his holdings in Dalton Township where he is doing precious metal exploration.

TABLE 12.3 **ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.**

Abbreviations Used:

DD - Diamond Drilling (where shown, the numbers following "D" indicate the number of holes drilled and the total length drilled respectively)
Geophys - Geophysical Survey
GL - Geological Survey
Mag - Magnetometer Survey
Rad - Radiometric Survey
SP - Self Potential
IP - Induced Polarization Survey
Benef - Beneficiation
Mech - Mechanical
STr - Stripping
Tr - Trenching
SA - Sampling, Assaying
BM - Base Metals
Verm - Vermiculite

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
Hastings Co. Dungannon Twp.	31F/4	Pipawa Explorations Ltd.	Nepheline	GL Geophys	Mapping Sampling Assaying Rad	1985	2.8220	Dungannon 22
Hastings Co. Faraday Twp.	31C/13	V. Di Girolamo	Building Stone	Manual Mech	Pits Power STr	1984	-	Faraday 78
Peterborough Co. Burleigh Twp. S.	31D/9	James Leon Byer	Calcium Carbonate	Drill Log	DD(1-200')	1984	-	Burleigh 20
Peterborough Co. Methuen Twp.	31C/12	Canadian Nickel Co. Ltd.	Ilmenite	Expend	Assay Costs	1981-1983	2.8100	Methuen 31
Peterborough Co. Methuen Twp.	31C/12	Canadian Nickel Co. Ltd.	Ilmenite	Drill Log	DD(1-75.59m.)	1983	-	Methuen 32
Peterborough Co. Methuen Twp.	31C/12	Canadian Nickel Co. Ltd.	Ilmenite	Drill Logs	DD(9-71329m.)	1983	-	Methuen 33
Renfrew Co. Admaston Twp.	31F/7	Sulpetro Minerals Ltd.	Zinc, Lead, Cadmium	GL Geophys Drill Logs	Mapping Mag,SP,IP DD(8-767.2m.) STr,Tr,SA	1983	63.4244 OM83-9-C9	Admaston 2
Renfrew Co. Blithfield Twp.	31F/2	Norman Pilatzke	Uranium	Mech	Tr	1984	-	Blithfield 19
Renfrew Co. Blithfield Twp.	31F/2	Norman Pilatzke	Uranium	Mech	Tr	1985	-	Blithfield 20
Renfrew Co. Griffith Twp.	31F/6	Gary H.K. Pearse	Mineral Filler Dolomite	Manual Mech	Power STr	1982-1984	-	Griffith 6
Renfrew Co. Griffith Twp.	31F/6	Trisar Resources Ltd.	Mineral Filler Dolomite	Assay & Benef. Studies	Sampling	1984-1985	2.8461	Griffith 7
Renfrew Co. Lyndoch Twp.	31F/3	Russell J. Crawford	Verm, BM Sulphides	Geophys GL Mech Manual	Rad Mapping Power STr	1984	2.7702	Lyndoch 28
Renfrew Co. Lyndoch Twp.	31F/3	Russell J. Crawford	Verm	Mech	Power STr	1985	-	Lyndoch 29
Renfrew Co. Maria Twp.	31L/1	Hartford Resources Inc.	Graphite	Drill Log	DD(1-148')	1984	-	Maria 3
Renfrew Co. Maria Twp.	31L/1	Thomas D. Saville	Graphite	Mech	Tr, Power STr	1984	-	Maria 4
Renfrew Co. Maria Twp.	31L/1	Hartford Resources Inc.	Graphite	Drill Logs	DD(37-7293')	1984-1985	-	Maria 5

R.L.V. Ekstrom staked the Spain Mine, a former molybdenum producer, in Griffith Township.

MINING ACTIVITY

The locations of the operating mines and quarries are shown in Figure 12.1.

During late 1984, Falconbridge Limited bought the remaining publicly held shares of Indusmin Limited and that company became a division of Falconbridge Limited. During 1985, Falconbridge Limited also bought the nepheline syenite operations of International Minerals & Chemical Corporation (Canada) Limited at Blue Mountain. All the nepheline syenite quarries and plants in Methuen Township are now being operated by Indusmin Division of Falconbridge Limited. Both plants produce a wide range of products for the glass, ceramic, fibreglass, and filler industries.

Chromasco Limited, a division of Timminco Limited, near Haley Station, Ross Township, produces in its reduction plant magnesium metal from dolomite mined in two pits on the property. High purity calcium and strontium metal is also produced on demand from material purchased off site. The company operated at capacity during 1985.

Crushed stone for aggregate is produced from two quarries in McNab Township. Crushed stone for aggregate, tile beds, and gabions, as well as flagstone, and edging stone is produced from four quarries in Harvey Township. Flagstone is also produced from the MacDonald Quarry in Lutterworth Township.

White dolomite is produced at the quarry of Bolender's Limited, Guilford Township, for poultry grit, golf sand, exposed concrete facing, and white bricks and mortar.

Rose quartz chips are produced on demand from the West Quarry of Wal-Gem Lapidary in Lyndoch Township.

Mineral specimens are produced from both the East and West Quarries of Wal-Gem Lapidary. Sodalite for the lapidary trade and mineral collectors is produced on a demand basis at the Princess Sodalite Mine, Dungannon Township, just east of Bancroft.

RECOMMENDATIONS

The Bancroft area is close to the markets of Ontario, Quebec, and the northeastern United States. Adequate road, rail, and water transportation routes exist, good access is normal, an adequate labour pool, and other features of a stable, well developed infrastructure are in place. A deposit of adequate size and consistent grade should be able to compete in these markets.

Potential exists in the area for graphite, talc, high purity calcium, high purity silica, and building stone. Mica as filler is still somewhat of a new industry, but the potential market is seen to be excellent. North American markets also exist for coarse "book" mica (muscovite or phlogopite) which, in the past, has been produced locally from pegmatite deposits.

In Ontario, Quebec, and New York State, several mines have operated, or are still operating, based on sphalerite associated with carbonate metasediments. Potential for such deposits exists in much of Eastern Ontario.

The Minden-Bancroft-Pembroke area has numerous pegmatite occurrences and, in the past, several mines were developed on these pegmatites. Pegmatites containing mica, silica, calcite, potassic feldspar, radioactive minerals, and rare earth minerals are known. Based on several coproducts, it may be possible to bring one, or several adjacent ones, into production.

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13. Eastern Resident Geologist Area, Eastern Region

P.W. Kingston[1] **and V.C. Papertzian**[2]

[1]Resident Geologist, Ontario Ministry of Natural Resources, Tweed

[2]Project Geologist, Ontario Ministry of Natural Resources, Tweed

INTRODUCTION

During 1985, exploration for industrial minerals and precious metals was the main activity by mining companies, prospectors, staff of the Resident Geologist's office, and of the Ontario Geological Survey (OGS). The emphasis was on gold, building stone (granite and marble), talc, calcium carbonate, graphite, and vermiculite.

RESIDENT GEOLOGIST'S ACTIVITIES

The office of the Resident Geologist for the Eastern Region is located in Tweed and is staffed by P.W. Kingston, Resident Geologist; L.G.D. Thompson, Geophysicist; S. van Haaften, Core Library Geologist; and three full-time contract geological staff. The contract staff consists of V.C. Papertzian, C.P. Verschuren, and D.A. Williams.

W.M. Kelly was the Assistant Core Library Geologist up until October 18, 1985, at which time he left the Ontario Government.

The office of the Regional Mineral Resources Coordinator is located in Kemptville and is staffed by T.W. Fletcher, Regional Mineral Resources Coordinator; Y.F. Young, Mineral Resources Specialist; and two contract and part-time staff, D. Brand and K. Klassen. Five Experience '85 students were hired to work on various geological projects in the region.

Most geological and geophysical activities are managed by the Resident Geologist in Tweed. All geotechnical, aggregate assessment, mineral education, and Provincial Parks projects are managed by the Regional Mineral Resources Coordinator in Kemptville.

As in previous years, much of the Resident Geologist's time was involved in providing a consultive technical service to companies and individuals engaged in mineral exploration and mining development in the Eastern Region. Selected mineral properties in the region were visited during the year either because of their importance to Ministry programs, or because of interest in, or work by, mining and exploration companies. Emphasis was placed on examining properties currently under development, especially those involving industrial minerals. Other activities included conducting and attending geological field trips and tours.

During 1985, P.W. Kingston and W.F. Caley (Associate Professor, Metallurgical Engineering, Technical University of Nova Scotia, Halifax), carried out an investigation of the historical and metallurgical aspects of small scale lead smelting practice in Eastern Ontario during the first decade of this century. In particular, refractory samples from the Ontario Mining and Smelting Company of the Hollandia Lead Mine near Bannockburn, in the County of Hastings, were collected and examined for alteration in mineral composition as a result of the smelting operation. Using electron microprobe and optical microscope techniques, an estimate of operating conditions such as flux usage and smelting temperature was determined.

The study showed that while the chemistry of the ore was not compatible with the type of refractory used, and while the matte permeated one third to one half of the brick, the lining still survived this particular operation. This was probably a result of a relatively low residence time of the melt in the shaft furnace, combined with the small number of heats to which the refractory was exposed.

The smelter at Hollandia was most likely abandoned because it did not suit the plans of the Stanley Smelting Company when it took over from the Ontario Smelting and Refining Company in 1905. The Stanley Smelting Company wanted a much larger capacity smelter located at the rail junction and capable of drawing on several mines for ore. In addition, the new smelter superintendent was more knowledgeable in lead smelting practice and the use of fluxing agents such as iron oxide and silica, and undoubtedly recognized the shortcomings of the Hollandia works.

A paper on this subject was presented by P.W. Kingston at the Joint Annual Meeting of the Geological Association of Canada and the Mineralogical Association of Canada in Fredericton, New Brunswick, in May 1985, as part of a special session on Applied Mineralogy in Science and Technology (Caley and Kingston 1985). The paper is currently in press in the Journal of the Mineralogical Association of Canada: Canadian Mineralogist (Caley and Kingston, in press).

In January of 1985, a special employment program (Mining Sector Work Program) was set up with the city of Cornwall acting as project sponsor. This project employed six people to carry out an exhaustive literature survey and to inventory all building stone occurrences in eastern Ontario. The program finished March 31, 1985, resulting in the publication of Open File Report 5556, Building Stones of Eastern Ontario, by C.P. Verschuren, S. van Haaften, and P.W. Kingston (1985). In addition, two Section 38 work programs employing ten people were initiated on September 3, 1985, sponsored by the Crowe Valley Conservation Authority. One consisted of collecting 300- to 500-pound test blocks of both granite and marble from potential building stone sites. A portable gasoline-powered drill and plugs and feathers were used to collect test blocks which were subsequently cut and polished into 1 inch thick, 12-inch square slabs.

The second project has upgraded, reorganized, and enabled computer access to the Eastern Region mineral deposits files, and was designed to be compatible with the mineral deposits systems at the Geoscience Data Centre, Ontario Geological Survey and at the Algonquin Region, Ministry of Natural Resources (MNR). The project employed 6 persons for 17 weeks.

The paper files and the computer databases are housed at the diamond-drill core library at Tweed and are available for public access.

FIELD TRIPS

In mid-January in Ottawa, the Current Activities Forum of the Geological Survey of Canada was attended by P.W. Kingston, V.C. Papertzian, C.P. Verschuren, and L.G.D. Thompson.

A tour of the new Karnuk Marble plant in Cornwall, Ontario, was arranged by P.W. Kingston, V.C. Papertzian, and C.P. Verschuren.

A two-day field trip was organized by the Southwestern Region Ministry of Natural Resources to look at a number of building stone quarries in the Paleozoic dolostones of the Bruce Peninsula. Arriscraft Corporation of Cambridge, Ontario was visited on the first day of the tour, while three quarries were visited on the second day in the vicinity of Wiarton, Ontario. P.W. Kingston, V.C. Papertzian, and C.P. Verschuren attended this field trip.

A four-day field trip organized by the Industrial Minerals Section of the OGS and Algonquin Region toured eastern Ontario and part of Quebec at the end of May 1985. Two days were spent looking at building stone properties in eastern Ontario. A few people continued on to Quebec City and toured a number of granite-finishing plants, as well as a number of granite quarries.

A four-day field trip to Vermont occurred on June 24 to 27, 1985. Both Rock of Ages and Vermont Marble finishing plants and quarries were visited.

In late October, a four-day building stone program was jointly hosted by OGS and Eastern Region. One and one-half days of lectures by Asher Shadman, a world-renowned stone consultant from Israel, were combined with a two-day field trip around both the Kingston and Cornwall areas. The field trip was organized and conducted by V.C. Papertzian and P.W. Kingston, who also edited the field trip guide (Papertzian and Kingston 1985). All geological staff from the Tweed office attended this field trip.

EXPLORATION ACTIVITY

In 1985, approximately 258 new claims were recorded in the Eastern Region, a decrease of 128 claims over 1984. This decrease is partly the result of gold properties being retained by companies for further exploration work (Table 13.1).

Figure 13.1 shows the area of claim staking activity and assessment work filed during the year. Claim staking activity decreased by 33%, while claim cancellations decreased to 225 compared to 372 last year in Eastern Region (Figure 13.2). Figure 13.3 shows the location of active mining properties as well as operating mills and processing plants.

Since much of the exploration work undertaken in Eastern Region is on private land, companies are not obligated to report activities. However, many have kept the Ministry of Natural Resources informed of their activities, and in many cases, have voluntarily supplied information on a confidential basis. It is, therefore, not possible to report on all of the exploration activity in the Eastern Region.

E B Canada Resources Limited (acquired by Imperial Metals Corporation) of Vancouver has not carried out any further work at the Addington Mine Property (Golden Fleece Deposit) since the winter of 1983. A total of 27 000 feet (8230 m) of diamond drilling has been completed on the property and has been donated to the Tweed Drill Core Library. To date the results have been encouraging.

No further exploration work has been carried out on the Ore Chimney Gold Mine Property since it was dewatered to the 150-foot level a couple of summers ago. A number of mining concerns have examined the property, but as yet no further work has been carried out.

Steep Rock Resources Incorporated explored for high-grade calcite (marble), and for other industrial minerals. The company continues to make heavy plant investments in Eastern Ontario for industrial mineral processing.

Canada Talc Industries Limited continues a modest exploration effort, mostly on their Madoc Property. Mine ore reserves have been substantially increased over the last few years and efforts to develop at least one new property are under way.

There has been considerable interest in graphite in the last year with active exploration on the more promising properties. The Cornell Property has changed hands recently and an exploration program is being planned by the new owners.

The Omya Incorporated flake muscovite mica deposit near Kaladar was re-evaluated this year, and several companies have examined the property. The mica appears to have good potential as a functional filler in the plastics industry.

Local prospectors R. Young and J. Byer have been actively exploring sillimanite, talc, and high-calcium marble properties.

Twin Buttes Exploration Incorporated optioned a talc property in Madoc Township and carried out a geological mapping program this summer. Several thousand feet of diamond drilling have indicated a possible 2-million ton talc deposit to a depth of 30 m. The company is now preparing a market study based on talc product samples.

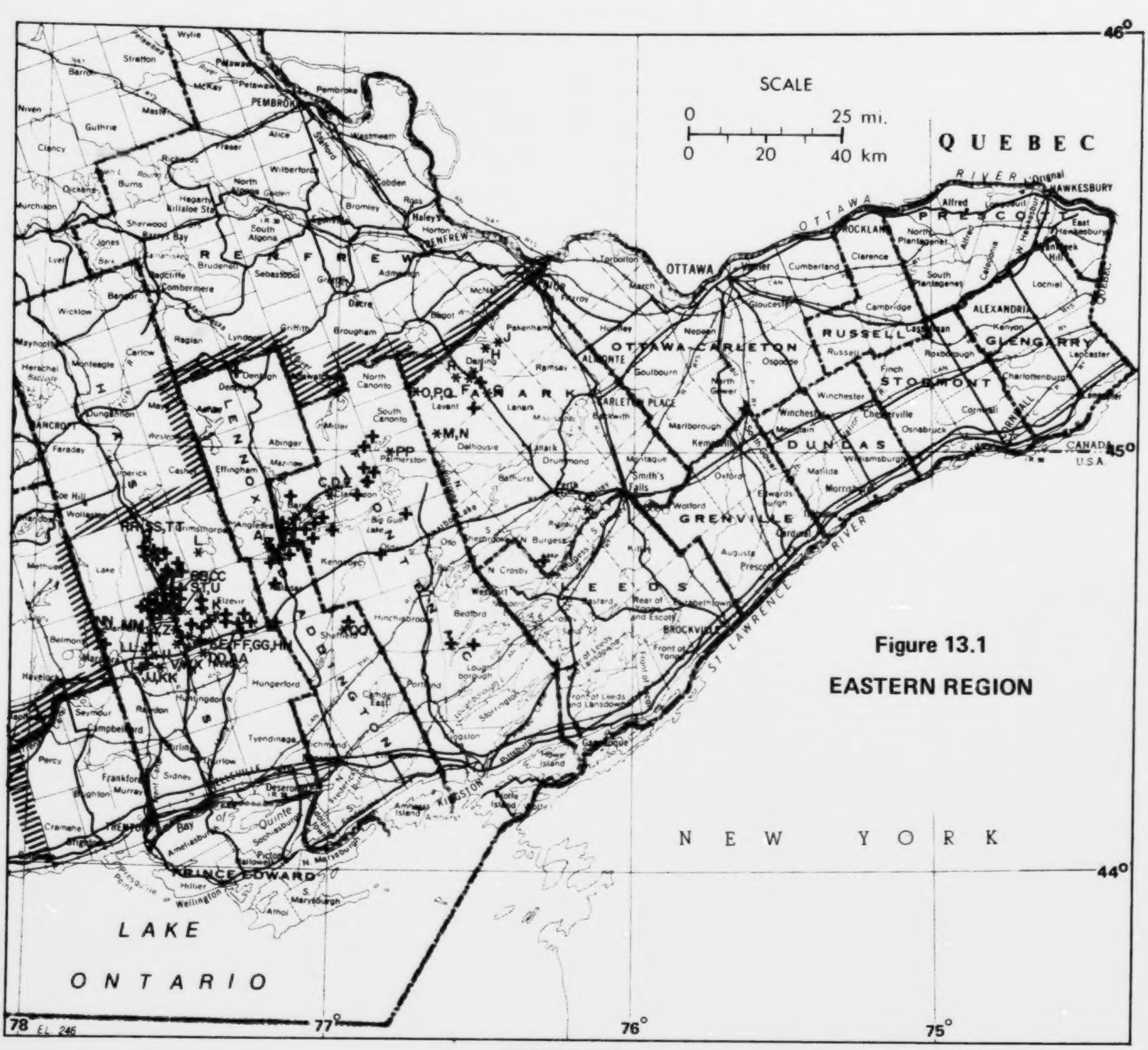
The following description of the Mono Gold Mines Incorporated Property at Bannockburn was taken from the George Cross Newsletter, dated October 8, 1985, Volume 194 (1985):

> The drilling has defined the northern and eastern boundaries of the visible gold mineralization (seen in drill cores), which occurs in 4 or more vein structures for a total vein length of 1260 feet. The veins vary in width between 0.1 feet and 3.0 feet, strike NW and dip NE at -45 to -65 degrees. The veins appear to be related to a transverse ENE striking flexure-fault that dips northward at 60 degrees. The best gold values have been obtained within 300 feet to the north of this structure and also to the south of it.

ASSESSMENT WORK AND OTHER INFORMATION RECEIVED.

TABLE 13.1

Location	NTS	File Name	Commodity Sought	Type of Report	Type of Work Performed	Date of Work	Toronto File Number	Local File Number
A Angelsea	31/C/14	S. J. Bartlett		Assess.	GL	1984		85-53
B Barrie	31/C/14	S. J. Bartlett		"	EM, Geochem.	1984		85-43
C Clarendon	31/C/14	G. Pearse		"	GL,EM,Geochem.	1983	2.5311	82-45
D Clarendon	31/C/14	St. Joe Canada Inc.		"	Mag. Survey	1985		85-57
E Clarendon	31/C/14	St. Joe Canada Inc.		"	EM	1985		85-65
F Darling	31/F/2	Kinbauri Gold Corp.		"	Mag., VLF-EM	1985	2.8388	85-48
G Darling	31/F/2	M. DiGirolamo		"	Manual Work	1985		85-63
H Darling	31/F/2	Steep Rock Resources		"	DD2-237'	1985		85-44
I Darling	31/F/2	Steep Rock Resources		"	DD1-225'	1985		85-45
J Darling	31/F/8	Steep Rock Resources		"	DD1-426'	1985		85-47
K Elzevir	31/C/11	J. L. Byer		"	DD2-1061'	1985		85-60
L Grimsthorpe	31/C/13	R. W. Lawrence	Au	"	Assay	1984	2.6304	83-53-54
M Lavant	31/F/2	Lacana Explorations Ltd.		"	Assay	1984	2.8000	85-16
N Lavant	31/F/2	Lacana Explorations Ltd.		"	Assay	1985	2.8000	85-17
O Lavant	31/F/2	Todd S. J. Sanders		"	Assay	1984	2.7891	85-6
P Lavant	31/F/2	Todd S. J. Sanders		"	Assay	1984	2.7891	85-7
Q Lavant	31/F/2	Todd S. J. Sanders		"	Assay	1984	2.7891	85-8
R Lavant & Darling	31/F/2	Lac Minerals Ltd.		"	Mag., VLF-EM	1984	2.7216	85-41
S Madoc	31/C/12	A. D. Houston		"	Power STr	1985		85-27
T Madoc	31/C/12	A. D. Houston		"	Power STr	1985		85-28
U Madoc	31/C/12	A. D. Houston		"	Manual Work	1985		85-29
V Madoc	31/C/12	A. D. Houston		"	Power STr	1985		85-34
W Madoc	31/C/12	A. D. Houston		"	Manual Work	1985		85-35
X Madoc	31/C/12	A. D. Houston		"	Power STr	1985		85-36
Y Madoc	31/C/12	A. D. Houston		"	Power STr	1985		85-37
Z Madoc	31/C/12	A. D. Houston		"	Manual Work	1985		85-38
AA Madoc	31/C/11	G. Pearse		"	Mag. Survey	1984	2.6683	84-13
BB Madoc	31/C/12	Mono Gold Mines Inc.	Au, Ag	"	DD1-262'	1985		85-24
CC Madoc	31/C/12	Mono Gold Mines Inc.	Au, Ag	"	GL	1984	2.7356	84-50
DD Madoc	31/C/11	Trisar, Resources Ltd.		"	Mag., VLF-EM	1985	2.7848	85-15
EE Madoc	31/C/13	W. P. Houston		"	DD1-101	1984		84-54
FF Madoc	31/C/13	W. P. Houston		"	Power STr	1984		84-55
GG Madoc	31/C/13	W. P. Houston		"	Manual Work	1984		84-56
HH Madoc	31/C/13	W. P. Houston	Building Stone	"	Power STr	1984		84-57
II Marmora	31/C/5	J. R. Harrington		"	Rad	1984		84-49
JJ Marmora	31/C/12	R. Bredberg	Au	"	Assay	1985	2.8287	85-39
KK Marmora	31/C/12	R. Bredberg		"	Manual Work	1985		85-40
LL Marmora	31/C/12	R. Ekstrom		"	SP	1984	2.6794	84-16
MM Marmora	31/C/12	R. Ekstrom		"	SP, Mag.	1984	2.6794	84-18
NN Marmora and Belmont	31/C/12	R. Ekstrom		"	Mag, VLF-EM	1985	2.7958	85-23
OO North Elmsley	31/C/16	Black Gregor Explorations Ltd.		"	DD4-1099'	1984		85-1
PP Palmerston	31/C/15	Sulpertro Minerals Ltd.		"	Mag., VLF-EM	1984	2.7638	84-60
QQ Sheffield	31/C/10	St. Joe Canada Inc.		"	Mag., Airborne	1984	2.7937	85-19
RR Tudor	31/C/13	N. Helm		"	Manual Work	1985		85-54
SS Tudor	31/C/13	N. Helm		"	Power STr	1985		85-55
TT Tudor	31/C/13	N. Helm	Au,Cu,Co	"	Assay	1985	2.8457	85-56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20
40 km
QUEBEC
NEW YORK
LAKE ONTARIO
OTTAWA RIVER
ST LAWRENCE RIVER
RENFREW
LANARK
OTTAWA-CARLETON
RUSSELL
PRESCOTT
GLENGARRY
STORMONT
DUNDAS
GRENVILLE
LEEDS
FRONTENAC
LENNOX AND ADDINGTON
HASTINGS
PRINCE EDWARD
PEMBROKE
OTTAWA
RENFREW
ALMONTE
CARLETON PLACE
SMITH'S FALLS
BROCKVILLE
KINGSTON
TRENTON
HAWKESBURY
CANADA
U.S.A.
46°
45°
44°
78
77°
76°
75°
EL 246

Figure 13.1
EASTERN REGION

EXPLANATION

*PP Assessment Work Filed in 1985 (keyed to TABLE 13.1)

+ Claim staking activity

▨ Boundary of Resident Geologist's Area

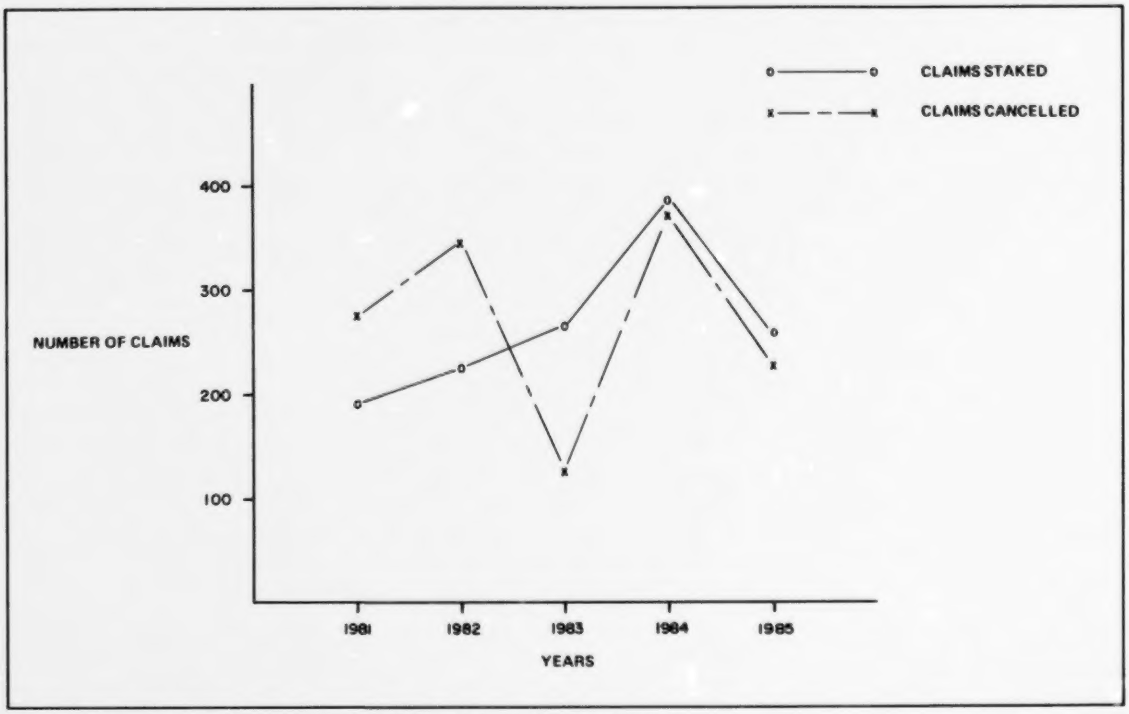


Figure 13.2 . Claim staking and cancellation activity in Eastern Ontario

Proven ore reserves require underground confirmation in this type of deposit, but, based on 31 diamond drill intercepts that have been diluted to 5.0 feet true widths at vertical depths between 5 and 240 feet, the drill indicated tonnage is about 90 000 tons grading 0.327 ounce of gold per ton. The drilling also indicates that additional reserves may be present in high grade linear shoots along the flexure fault, but, these will require underground sampling for confirmation. Further reserves could be established SW of the flexure fault, where additional drilling has yet to be conducted. Also, the depth of gold mineralization remains to be established.

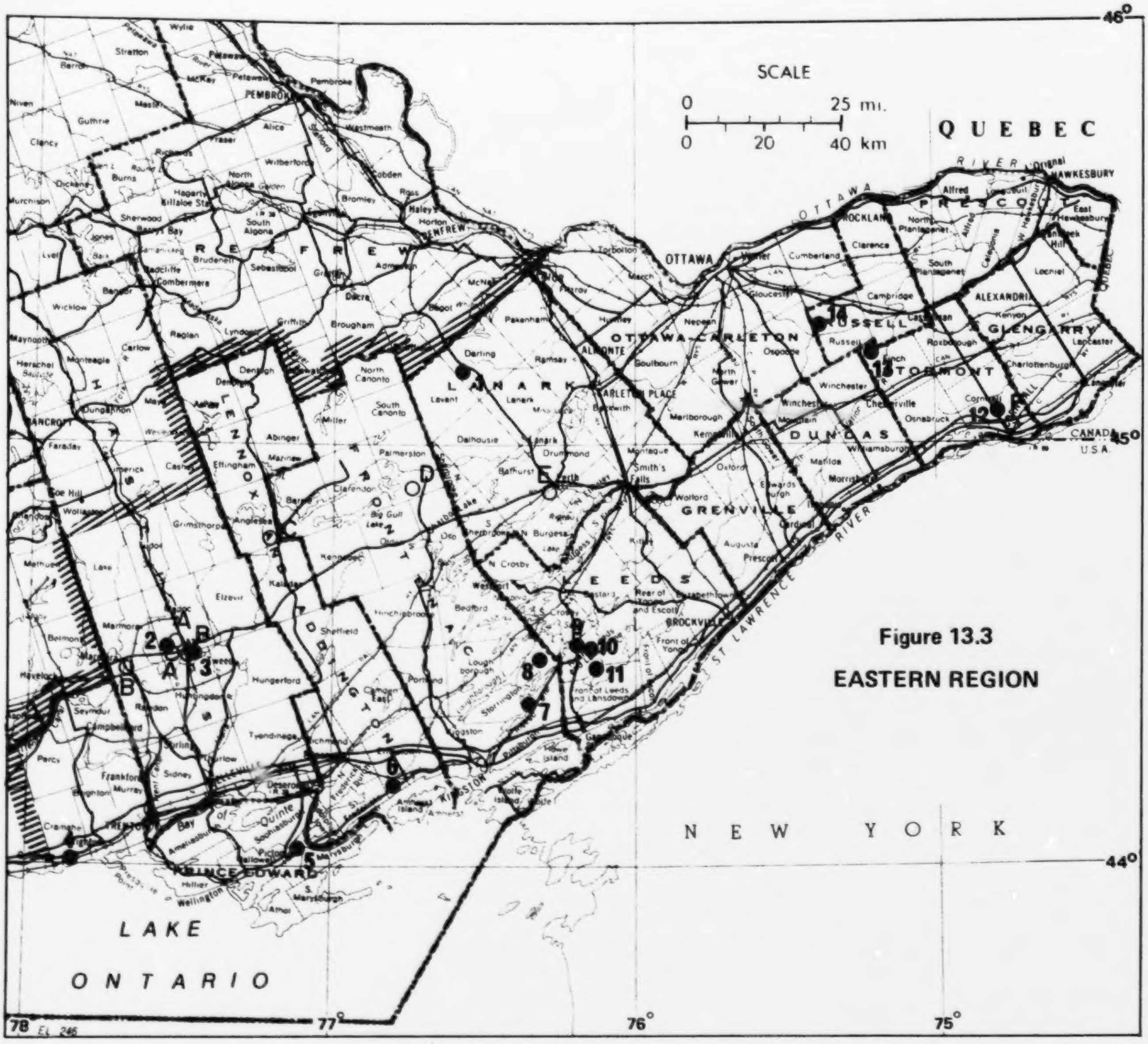
Elsewhere on the property, ongoing geochemical soil surveys have identified 3 linear anomalies. One, within 600 feet of the old Bannockburn gold mine, is 1200 feet long and open at both ends.

Ram Petroleums Limited hold mining leases on a large talc-tremolite body and operate a mill near Robertsville. The company, through Commercial Industrial Minerals Limited, a subsidiary, are strongly promoting the use of the tremolite product (called clarendite by the Company) as an asbestos-substitute binder in asphalt paving. The company has spent $120 000 modifying the grinding circuits and installing a dryer. The following is quoted from The Northern Miner (December 9, 1985).

> Based on diamond drilling, the deposit contains 2 862 000 proven tons of ore to a depth of 250 ft. Reserves are 2 200 000 tons of clarendite, 390 000 tons of talc and 143 000 tons of phlogopite mica.
>
> The deposit is zoned and mica and talc zones can be mined selectively by open pit. Test results show that the phlogopite can be separated from clarendite by a dry screening process. The orebody is open along strike and to depth. Mining is by open pit. The dry milling method uses a Hardinge autogenous mill.
>
> Tests are currently under way to evaluate the potential of clarendite in a number of other applications. The most promising use of clarendite is as concrete reinforcing additive.

The company has also done property evaluations and mill tests on sillimanite, muscovite mica, and talc.

Karnuk Marble Industries Incorporated of Cornwall has recently installed a very large Breton gang saw to cut 20-tonne granite blocks into slabs to make exterior cladding for building. The company is producing marble tiles from imported stone and is actively exploring several Ontario sources.


SCALE
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20
40 km
QUEBEC
OTTAWA RIVER
HAWKESBURY
PRESCOTT
ROCKLAND
OTTAWA
RENFREW
PEMBROKE
OTTAWA-CARLETON
RUSSELL
GLENGARRY
ALEXANDRIA
STORMONT
DUNDAS
GRENVILLE
LANARK
LEEDS
BROCKVILLE
LENNOX
FRONTENAC
ADDINGTON
KINGSTON
PRINCE EDWARD
Bay of Quinte
ST. LAWRENCE RIVER
NEW YORK
LAKE ONTARIO
CANADA
U.S.A.
46°
45°
44°
78
77°
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D
E
F

Figure 13.3

EASTERN REGION

EXPLANATION

● 5 Producing Mines

1.	Steep Rock Ltd.	calcium carbonate
2.	Stoklosar Marble Quarries Ltd.	marble
3.	Canada Talc Industries Ltd.	talc and marble
4.	St. Lawrence Cement Co. Ltd., Ogden Point Quarry	limestone, cement
5.	Lake Ontario Cement Co. Ltd.	limestone, cement
6.	Canada Cement Lafarge Ltd.	limestone, cement
7.	N. Sloan	decorative stone
8.	Fairmont Granite	monument stone
9.	Rideau Granite Inc.	monument stone
10.	W. R. Barnes Co. Ltd.	decorative stone
11.	F. Weisner	decorative sandstone
12.	Cornwall Sand and Gravel	monument stone
13.	A. L. Blair Construction Ltd.	lime
14.	Canada Brick	shale for brick

▨ Boundary of Resident Geologist's Area

○A Operating Mills

- A. Stoklosar Marble Quarries Ltd.
- B. Canada Talc Industries Ltd.
- C. W. R. Barnes Co. Ltd.
- D. Ram Petroleum's Ltd.
- E. Steep Rock Ltd.
- F. Karnuk Marble Ltd.

MINING ACTIVITY

Canada Talc Industries Limited continued to operate their underground talc mine and adjoining open pits (dark talc, and talciferous dolomite) at Madoc, and their processing plants at Madoc and Marmora. Production is up to approximately 50 000 tons per year (up from 20 000 tons per year several years ago). About 70% of ore mined is high brightness talc and is about 30% is dark talc (brightness about 80). The high brightness talc is ground to make a number of products ranging from 50 to 10 microns in size, including filler for plastics, paint, paper, rubber, tile, and carpets. The dark talc is used in the manufacture of automotive body patch compounds. In addition, several thousand tons annually of talciferous dolomite are ground and sold for specialized filler markets. The company is agressively pursuing expansion plans in both high-brightness and dark talc markets, and is planning plant improvements in the near future.

Steep Rock Resources Incorporated operate an open pit calcite mine near Tatlock and a plant at Perth. Quarrying is done by contract in the summer months, and in excess of 100 000 tonnes is trucked to the plant which operates 12 months of the year employing 56 men. Products include finely ground calcite for filling and coating paper, plastics, rubber, stucco, and floor tile. Other products include crushed and sized calcite for golf traps, agricultural lime, landscape stone, decorative stone, and precast concrete. The finer grinds are shipped by tank truck or semibulk bags, while the coarser sizes are mainly bagged for shipment.

In late 1985, construction of an ultrafine plant to grind and float micron-size calcite was commenced. This plant is a joint venture of Steep Rock Resource Limited and Georgia Kaolin Limited (Canadian Division) and will produce a premium product destined mainly for the alkali paper market in the United States and Canada.

Fairmont Granite Limited-Battersea Quarry Planned production from the Battersea Quarry for 1985 was 20 000 cubic feet of granite. Some of this production was shipped to Vancouver, B.C., to be used in the Bank of British Columbia. The remainder was shipped to Japan, Vermont, and Quebec. The recovery at this quarry site is approximately 35% to 40%. The granite is uniformly pink in colour, and grain size varies from medium to coarse. Limited jointing occurs in a regular pattern. Some chloritic seams containing scattered pyrite are seen in some of the waste blocks in the grout pile. Discontinous quartz veining also occurs in this deposit. Six workers are employed from early Spring to late Fall.

Fairmont Granite Limited is a wholly-owned subsidiary of Rock of Ages Corporation of Barre, Vermont.

Sloan Quarry: Five small quarry openings are located on the Sloan farm on lot 11, concession 6, Storrington Township, Frontenac County. One of the quarries is operated by Rideauview Contractors Limited, employing 11 men. The face of this quarry is approximately 15 feet to 20 feet high. The stone is a medium- to thin-bedded buff and salmon pink to red Potsdam sandstone. It has been known as "Kingston Hue".

This stone is marketed for decorative use (e.g. fireplaces, feature walls) and is sold by the pallet load from the quarry site. Some of the waste stone was sold this year for use in the manufacture of fibreglass.

Stoklosar Marble Quarries Limited operated approximately nine marble quarries in the vicinity of Madoc during 1985, and operated two crushing, screening, and bagging plants in and near Madoc. In 1982, Stoklosar Marble Quarries Limited was formed by the amalgamation of Grenville Aggregate Specialties Limited and Stoklosar Marble Quarries (1969) Limited. The company produced 4038 tons of crushed marble, an increase over the 1984 production. The marble is crushed to produce a wide range of products. Terrazzo chips make up 46% of the production, while precast panels account for 30%. Stucco, decorative stone, and dust comprises 15%. Nine percent of the total production is shipped to the United States.

The following production figures are broken down by colour and are from both plants. A quarry north of Eldorado produced 1068 tons this year of medium-grained buff coloured marble, the most popular colour shipped.

A quarry north of Malone on the Moira River produced 906 tons of white marble. During the crushing process, 413 tons of white dust were collected and sold as additive for cement in the construction of swimming pools. The buff and white coloured products account for one half of the total production figure.

Other colours produced are: light buff (540 tons); pink (369 tons); light green (389 tons); chocolate red (257 tons); blue (97 tons); and black (55 tons).

The terrazzo chip product is marketed through Domus Engineering Limited of Toronto and is used in construction projects throughout eastern North America.

A.L. Blair Construction Limited produced 15 000 to 20 000 tonnes of agricultural lime from their St. Albert quarry in Finch Township near Cornwall, Ontario. The agriculture lime is crushed by hammer mill to pass a 50 mesh screen.

Rideau Granite Limited operated two granite quarries at Straw Hill near Seeleys Bay under the management of R. Cloutier. About 200 tons of red granite blocks were quarried for architectural and monument purposes. Mr. Cloutier also operates a small granite finishing plant in Brockville.

Cornwall Gravel Company Limited has stripped an area northeast and adjacent to their main limestone aggregate quarry two miles north of Cornwall, and produced approximately one hundred 8- to 12-ton building stone blocks from the topmost of two thick (1.2 to 1.5 m) layers of Lower Bobcaygeon black limestone. When polished, the limestone is an attractive black and contains small irregular patches of white to grey limestone. Karnuk Marble Industries Incorporated have purchased a number of blocks to fill several orders for 12-inch by 12-inch tiles.

U. Kretchmar (of Severn Bridge) and Aur Resources Incorporated (of Toronto) are re-evaluating the Tweed marble quarry located about 4 miles north of Tweed. This formerly producing quarry operated in the late 1960s and provided commercial architectural slabs for numerous building projects, including the Canada Trust Building in Toronto, the Provincial Museum and Archives Building in Edmonton, Alberta, and the St. Lawrence Centre in Toronto. The marble was cut and polished in four colours: Tweed White, Tweed Vert, Tweed Pearl, and Tweed Variegated.

ONTARIO GEOLOGICAL SURVEY ACTIVITIES

The Precambrian Geology Section released the preliminary geology map for the Mellon Lake area by Bright (1985). This map covers the western portion of the Claire River Syncline, an area which is being actively explored by several companies for flake muscovite mica.

The Engineering and Terrain Geology Section of the Ontario Geological Survey was active in Eastern Region during the 1985 season (Figure 13.4).

Paleozoic geology maps of part of the Ottawa-St. Lawrence Lowland were published in April 1985. The map areas consist of the following: Russell-Thurso (Williams, Rae, and Wolf 1985a); Hawkesbury-Lachute (Williams, Rae, and Wolf 1985b); Alexandria-Vaudreuil (Williams, Rae, and Wolf 1985c); Cornwall-Huntingdon (Williams, Wolf and Carson 1985a); Winchester (Williams, Wolf, and Carson 1985b); and Morrisburg (Wiliams, Wolf, and Carson 1985c). A final report on the Paleozoic geology of the Ottawa-St. Lawrence Lowland is in preparation by D.A. Williams.

Another six Paleozoic geology maps were published in early December, 1985. The map areas consist of the following: Pembroke Area (Russell and Williams 1985a); Fort Coulonge Area (Russell and Williams 1985b); Golden Lake Area (Russell and Williams 1985c); Cobden Area (Russell and Williams 1985d); Brudenell Area (Russell and Williams 1985e) and Renfrew Area (Russell and Williams 1985f).

The Mineral Deposits Section carried out several programs in eastern Ontario, one of which (vermiculite) was a joint project with Eastern Region staff (MacKinnon *et al.* 1985a, 1985b, 1985c, in press). Malczak *et al.* (1985) completed an open file report on base metal, molybdenum, and precious metals in the Madoc-Sharbot Lake area. Malczak (1985) completed a map to accompany this report that was based on the recently completed geological compilation map by Kingston, Papertzian, and Williams (1985).

An open file report on the geology of selected gold occurrences in Anglesea, Barrie, and Clarendon Townships was written by Barron (1985). A study on talc in the Tudor Formation in southeastern Ontario was released as Open File Report 5530, by Dillon and Barron (1985), and an Open File Report on Gold-Quartz-Arsenopyrite veins geologically related to the base of the Flinton Group in Kaladar and Barrie Townships was completed by Dillon (1985).

M. Vos is studying the potential for ceramic raw materials in granites and anorthosites in the Westport Area. An interim report of his activities was published this year (Vos 1985). There appears to be some potential for producing potassium feldspar along with by-product quartz.

J. Springer is continuing to study the concentration of iron oxides and gold at the Paleozoic-Precambrian unconformity in the Madoc area (Springer 1985). The potential for developing small deposits of iron oxides pigments looks promising.

GEOLOGICAL MAPPING

GENERAL GEOLOGY

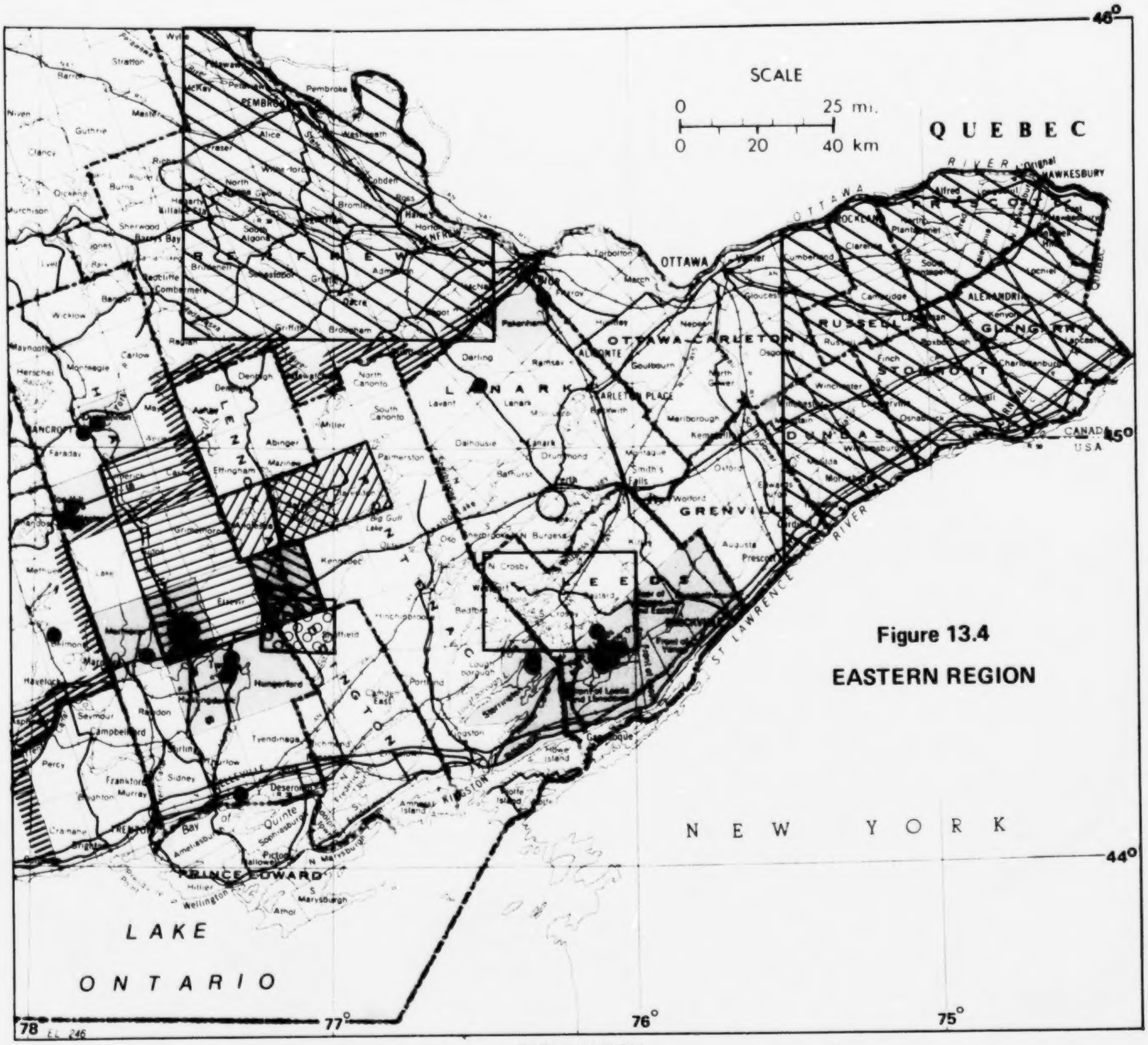
The Geology and Mineral Deposits Map of the Kingston Area, compilation sheet (NTS 31 C), was published as a preliminary map (P.2611, scale 1:125 000) in early 1985 (Kingston, Papertzian, and Williams 1985). This map synthesizes geological data from 53 published maps as well as information from assessment work files and the geological files of the Resident Geologist's office. The map also includes the location of, and references to, 1129 mineral deposits in the area and replaces Geological Circular 12, and Maps 2053 and 2054, by Hewitt (1964), now out of print.

VERMICULITE

A vermiculite mapping project sponsored by the Crowe Valley Conservation Authority began in late 1984 (Figure 13.4), and continued in 1985. The area in and around the Olympus vermiculite pit was mapped at a scale of 1:10 000 (Figure 13.5). A preliminary report on this project was published by MacKinnon *et al.* 1985b).

The rocks observed in the map area consist of three general groups, each having a significant role in the development of vermiculite, which is best seen in a mineralized zone on the Olympus Mines Limited Property, Lanark County. The groups include: the Grenville Supergroup Metasediments, Late Precambrian Intrusive rocks, and Paleozoic rocks. The host of the mineralized zone is pyroxenite, a remetamorphosed unit of the Grenville Supergroup. Late Precambrian syenitic and dioritic intrusions provided the source of hydrothermal solutions, rich in silica and magnesium, which altered the dolomitic marble to pyroxenite and converted phlogopite to vermiculite. The Paleozoic rocks are not important in the development of the mineralized zone, but are still an essential component. This thin unit probably preserved the vermiculite by capping the soft pyroxenite during the main phases of glaciation. The waning phase of glaciation subsequently scraped off the last remnants of the Paleozoic Nepean Formation, exposing the pyroxenite to surficial weathering.

A market exists for a favourably located Ontario (Perth) producer for vermiculite concentrates of approximately 27 000 to 32 000 tons per year and an additional 8000 tons per year for expanded vermiculite (Beauregard 1982). Current uses of vermiculite


SCALE
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25 mi.
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40 km
QUEBEC
OTTAWA RIVER
OTTAWA
PEMBROKE
HAWKESBURY
RENFREW
LANARK
OTTAWA-CARLETON
RUSSELL
GLENGARRY
STORMONT
DUNDAS
GRENVILLE
LEEDS
FRONTENAC
LENNOX
ADDINGTON
HASTINGS
PRINCE EDWARD
BANCROFT
TRENTON
BELLEVILLE
KINGSTON
BROCKVILLE
ST LAWRENCE RIVER
Bay of Quinte
NEW YORK
LAKE ONTARIO
CANADA
USA
46°
45°
44°
78
77°
76°
75°
EL 246

Figure 13.4
EASTERN REGION

EXPLANATION

- ▧ Paleozoic Rock Mapping (Williams, Rae, Wolf, Carson, and Russell 1985)
- ○ Vermiculite Studies (MacKinnon 1985)
- ■ Building Stone Reconnaissance Survey (Verschuren and Papertzian 1985)
- • Building Stone Sites Sampled
- ▨ Geology of Selected Gold Occurrences (Barron 1985)
- ▧ Mapping of Gold Quartz - Arsenopyrite Veins (Dillon 1985)
- ▨ Talc in the Tudor Formation (Dillon and Barron 1985)
- //// Boundary of Resident Geologist's Area
- ◎ Geology of the Mellon Lake Area (Bright 1985)
- ● Iron Pigments and Gold (Springer 1985)
- ☐ Ceramic Raw Materials (Vos 1985)

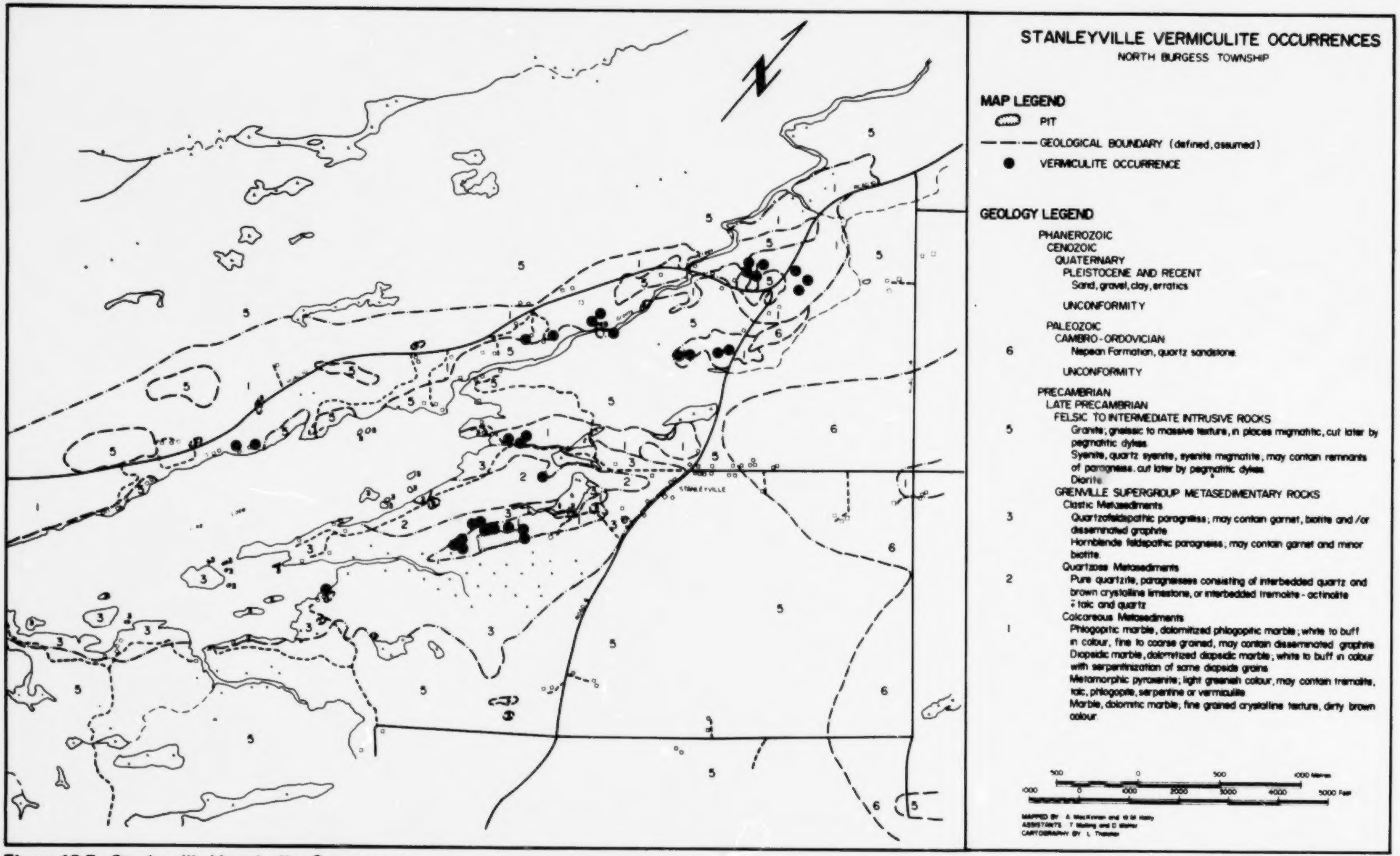
STANLEYVILLE VERMICULITE OCCURRENCES
NORTH BURGESS TOWNSHIP
MAP LEGEND
PIT
GEOLOGICAL BOUNDARY (defined, assumed)
VERMICULITE OCCURRENCE
GEOLOGY LEGEND
PHANEROZOIC
CENOZOIC
QUATERNARY
PLEISTOCENE AND RECENT
Sand, gravel, clay, erratics
UNCONFORMITY
PALEOZOIC
CAMBRO-ORDOVICIAN
6 Nepean Formation, quartz sandstone
UNCONFORMITY
PRECAMBRIAN
LATE PRECAMBRIAN
FELSIC TO INTERMEDIATE INTRUSIVE ROCKS
5 Granite; gneissic to massive texture, in places migmatitic, cut later by pegmatitic dykes
Syenite, quartz syenite, syenite migmatite, may contain remnants of paragneiss, cut later by pegmatitic dykes
Diorite
GRENVILLE SUPERGROUP METASEDIMENTARY ROCKS
Clastic Metasediments
3 Quartzofeldspathic paragneiss; may contain garnet, biotite and/or disseminated graphite
Hornblende feldspathic paragneiss; may contain garnet and minor biotite.
Quartzose Metasediments
2 Pure quartzite, paragneisses consisting of interbedded quartz and brown crystalline limestone, or interbedded tremolite - actinolite ± talc and quartz
Calcareous Metasediments
1 Phlogopitic marble, dolomitized phlogopitic marble; white to buff in colour, fine to coarse grained, may contain disseminated graphite
Diopsidic marble, dolomitized diopsidic marble; white to buff in colour with serpentinization of some diopside grains
Metamorphic pyroxenite; light greenish colour, may contain tremolite, talc, phlogopite, serpentine or vermiculite
Marble, dolomitic marble; fine grained crystalline texture, dirty brown colour
500 0 500 1000 Metres
1000 0 1000 2000 3000 4000 5000 Feet
MAPPED BY
ASSISTANTS
CARTOGRAPHY BY
STANLEYVILLE
5
6
3
2
1

Figure 13.5 . Stanleyville Vermiculite Occurrences

include horticulture, light weight plasters, loosefill insulation, and insulatory light weight concrete. An important consideration to the continued development of vermiculite resources is continued research and development of new technology such as improved beneficiation methods and new applications. For example, research has extended the use of vermiculite into glass fibre papers and textiles which are heat and fire resistant products, previously requiring asbestos.

R. Collings and J.M. Lamothe, (CANMET) are conducting beneficiation tests on a 350-pound chip sample and on a split drill core sample obtained from the Olympus Mines Property during this project.

A problem of considerable importance to environmentalists and government agencies is the presence of asbestiform fibres in dust from vermiculite operations. E. Chatfield of the Canadian Research Foundation is testing vermiculite from the Olympus pit for the presence of asbestiform fibres. The absence of fibre is essential to the viability of deposits.

A poster display and formal presentation was given at the Ontario Geological Survey Geoscience Research Seminar in Toronto in early December 1985, by MacKinnon *et al.* (1985a, 1985c). Information on this project was also published in the 1985 Summary of Field Work (MacKinnon *et al.* 1985b). A detailed open file report by MacKinnon *et al.* is now in press.

BUILDING STONE

A joint building stone program between the Eastern and Algonquin Regions, Ministry of Natural Resources, commenced early in the spring of 1985. The area covered by this project is shown on Figure 13.4. This project is summarized by Verschuren (1985). The main purpose of this program was to obtain an overview of building stones in each of the respective regions. To date, approximately 90 properties or areas have been investigated. A two-page folio has been completed for each property and in a number of cases a detailed map was produced. A poster display entitled "Building Stones of Central and Southeastern Ontario" by Kingston, Verschuren, Papertzian, and Villard (1985), summarizing some of the more interesting occurrences, was presented at the Ontario Geological Research Seminar in December of 1985. An open file report was completed on the program at the end of December 1985, (Verschuren, Papertzian, Kingston, and Villard, in press).

GEOTECHNICAL ENGINEERING PROGRAM by K. Klassen and T. Fletcher

The study of earth slope failures along the Ottawa River and its tributaries in the United Counties of Prescott and Russell has continued in the 1985 field season. This program is jointly funded by the Ontario Ministry of Municipal Affairs and Housing and the Ontario Ministry of Natural Resources. The objective of this study is to establish construction setbacks for use in planning residential development.

The slopes have been surveyed to establish geometry, stratigraphy, and evidence of failure. Over one hundred field vane tests have been performed, and nine sites sampled for laboratory testing. An additional four sites will be tested this fall.

A field trip was conducted in the United Counties for geologists from several universities and the Canadian and Ontario Geological Surveys.

The Mississippi Conservation Authority has initiated a program to test the clay at four sites in the Mississippi area, with Ontario Ministry of Natural Resources involvement. Data from the program will be used to help establish construction setbacks in the Mississippi area.

The Regional Mines Coordinator and his staff have continued to promote public awareness of landslides and landslide hazard lands and to provide consultations for specific sites and liaison and planning input to municipalities and conservation authorities.

AGGREGATE RESOURCES by Andrew Young

Drift thickness mapping of the Paleozoic bedrock continued this year in the United Counties of Leeds and Grenville.

The mapping outlines areas of bedrock within 1.5 m (5 feet) of the surface, and classifies the rock according to its aggregate potential (e.g. asphalt, granular A, etc.)

The study involves the compilation of geological maps with airphoto interpretation, water well logs, Ministry of Transportation and Communication's data, and field inspections. The compiled depth information enables contours to be drawn delineating the bedrock within the specified depth.

DIAMOND DRILL CORE LIBRARY by S. van Haaften

Staffing

S. van Haaften is currently the acting Core Library Geologist. W.M. Kelly was the assistant core library geologist until October, 1985, and K. Klein and T. Mullings were summer assistants.

Services

The following resources and services are offered:

(a) drill core from southern Ontario;
(b) facilities for logging and splitting core;
(c) binocular and petrographic microscopes;
(d) rock cutting and polishing equipment;
(e) geological maps and reports for use in the core library;
(f) eastern Ontario mineral deposits and building stone database searches on a microcomputer;
(g) searches of the Ontario Mineral Deposits Inventory database; this OGS database is accessed over telephone lines by the core library microcomputer; and
(h) the assessment files, mineral deposit files, and old underground mine plans from the Resident Geologist's office are currently housed in the core library.

As of December 2, 1985, 48 816.6 m of core were catalogued, and approximately 10 000 m of

TABLE 13.2 SUMMARY OF TWEED CORE LIBRARY HOLDINGS
December 2, 1985

Township	Company	Depth Drilled (M)	Core Stored (M)
	Bethlehem Steel	184.8	184.8
	Ontario Hydro	1 608.7	1 608.7
	Ultimate Energy	314.8	218.6
Barrie	Grandad Resources	913.5	913.5
Belmont	Cordova	2 980.7	2 500.5
Belmont	Preussag	1 211.9	1 211.9
Belmont	W.S. Moore	1 480.2	1 457.4
Clarendon	Selco Inc.	245.1	245.1
Elzevir	Steeprock	516.2	516.2
Kaladar	C.R. Young	153.2	130.4
Kaladar	J. Byer	123.0	123.0
Lanark	Selco Clyde River	>1 267.4	1 267.4
Madoc	Bannockburn Mine	260.6	177.6
Madoc	Freeport Exploration	2 961.3	2 075.9
Madoc	Mono Gold Mines Inc.	702.0	702.0
Madoc	Sager	1 562.3	1 332.7
Madoc	Syngenore	3 438.4	2 388.8
Marmora	Ackerman	37.1	37.1
Marmora	Bethlehem Steel Corp.	13 377.2	4 684.1
Marmora	Gold Brooke Expl.	>829.0	829.0
Methuen	Preussag	190.6	190.6
N. Elmsley	Globe Graphite	880.6	730.6
Olden	Lynx Canada Expl.	>16 065.3	16 065.3
Palmerston	Fairfield Projects	152.4	152.4
Seymour	W.S. Moore	>9 490.9	9 490.9
Sommerville	OGS/SSFC	28.0	28.0
South Fredericksburgh	Lennox Generating Stn.	107.5	107.5
Wentworth P.Q.	Black Gregor Expl.	84.4	84.4
Total		>61 167.1	48 816.6

recently acquired core had yet to be entered into the catalog. Table 13.2 summarizes the library's catalogued holdings. During 1985, 19 195 m of core were catalogued.

Activities

As well as assisting clients and collecting, sorting, cataloguing, and documenting drill core, core library staff were involved in carrying out the following special projects:

(a) Computer-assisted compilation of building stone deposits in eastern Ontario. The compilation was carried out by a Section 38 program, and resulted in publication of the Open File Report "Building Stones of Eastern Ontario" (Verschuren, van Haaften, and Kingston 1985).

(b) Managing the compilation of a computerized mineral deposits inventory for eastern Ontario. This inventory is being compiled by a Section 38 program and is available for use at the core library.

(c) Participating in the MNR/OGS Perth Area Vermiculite project. W.M. Kelly assisted in the mapping, geophysics, and diamond drilling project.

(d) Minerals education. S. van Haaften gave geology talks at two elementary schools, led geology trips for teachers, junior rangers, and the Perth Naturalists' Club, and set up a publications and information booth at the Ottawa Lapsmith Club gem show.

SEISMIC SURVEYS by L.G.D. Thompson[1]

[1] Regional Geophysicist, Eastern Region, Ontario Ministry of Natural Resources, Tweed

In December 1984, at the Ontario Geoscience Seminar, the Regional Geophysicist presented a poster display on engineering seismic equipment and bedrock mapping.

In May 1985, at the request of B. Feenstra, Mineral Resources Geologist, Southwestern Region, the Regional Geophysicist visted several dimension stone quarries in the Bruce Peninsula. Consultation and advice were provided on the application of seismic methods to the assessment of dimension stone deposits.

In July 1985, an engineering seismic survey was conducted in the Russell-Lemieux area of Eastern Ontario to verify the location of faults identified on the Preliminary Paleozoic Geology Map P.2717 published in the spring of 1985 (Williams *et al.* 1985a). A detailed report on this seismic survey is published in the Summary of Field Work, 1985, Ontario Geological Survey (Thompson 1985).

In September and October 1985, at the request of the Regional Geologist, Central Region and the District Geologist, Maple District, an engineering seismic survey was performed in the northwestern part of Brock Township. The purpose was to outline areas where Verulam limestone bedrock was very close to the surface. This information was needed to update the Ontario Geological Survey Aggregate Resources Inventory Paper No. 6 for Brock Township. This paper only outlined an area where the bedrock is covered by less than 8 m of overburden. Two seismic test lines and six actual survey lines were completed in an area where the seismic data showed bedrock to be from 1 to 10 m below the surface.

In October 1985, two seismic test lines were done on or near the property of John Bell near Clayton in Ramsay Township. The purpose was to trace an inferred fault in Grenville marble across the Bell property. Seismic results showed a slight (0.5 m) depression in the marble bedrock at the first site and a sharp 4 m drop in the marble bedrock at the second site.

In October 1985, engineering seismic tests were conducted at the Roblindale Quarry just south of Roblin in Camden Township in conjunction with a drilling program being done by Ontario Hydro in the quarry floor. The purpose was to try to map the Precambrian basement topography below the Gull River dolostone of the quarry floor. The seismic tests indicated that this is a difficult task. More test work is needed with particular attention being given to the type and location of the energy source.

In December 1985, Thompson (1985a) prepared a display and demonstration illustrating methods of seismic fault locating. Thompson (1985b) also published a paper on use of an engineering seismograph to locate buried faults.

GEOPHYSICAL STUDY OF FLUORITE DEPOSITS

INTRODUCTION

A geophysical investigation of the Moira fault and associated fluorite deposits in the Madoc area was initiated in the fall of 1984, with most of the reported work being done in 1985. The project supports the priority objective of the Ministry to stimulate the mining economy by the development of new mines. The Madoc area was a major producer of fluorite from 1905 to 1961 (Guillet 1964) when the availability of cheaper fluorite from Mexico forced the closure of the mines. Much of the area along the Moira fault, particularly to the northwest and southeast of previous mines, is difficult to explore except by geophysical methods. If viable fluorite deposits do exist in these areas and can be discovered, fluorite mining may once again be possible for the domestic market.

The only known reference to geophysical work done on the Moira fault and fluorite veins is in a report by Guillet entitled Fluorspar in Ontario (Guillet 1964). In 1944, A.A. Brant tried different geophysical methods along the Moira fault (Brant 1944). As reported by Guillet, self-potential and magnetic methods proved to be of little value. The resistivity method proved to be of most value. Resistivity measurements did not indicate the fluorite veins themselves, but did indicate the fault as a zone of higher conductivity usually coincident with a bedrock depression. Fluorite deposits were noted to be usually associated with the margins of the conducting zone.

Since direct detection of fluorite veins seems unlikely, this study has been divided into several phases as a logical approach to the application of geophysical methods. The first phase is to resolve whether or not the main fault break can be detected by geophysical methods at sites where the fault zone is known to exist. The second phase is to trace the main break into other areas of overburden where fluorite deposits may exist. The third phase is to find a correlation between fluorite veins and some characteristic feature of a geophysical anomaly associated with the fault. The fourth phase is to try to find new fluorite deposits associated with the main fault break. A further phase would be to extend the geophysical survey capability to find fluorite veins in parallel and *en echelon* fractures associated with the main fault.

Selection of suitable test sites where knowledge of the fault and fluorite veins was available was difficult. The old mine sites are now overgrown, with the surface and bedrock very disturbed, and are generally unsuitable for performing geophysical surveys. Therefore, attention was given to areas along the fault northwest and southeast of largest mines. Five sites were selected which are shown on Figure 13.6. At the Bailey mine, there is a large, fairly level, hay field northwest of the old mine workings. This offered the opportunity for geophysical tests over a known location of the Moira fault with a fluorite vein within the fault zone (although mined out). A similar but less favourable survey site is along the road between the Noyes and Johnston Mines. Another favourable site is on the Crookston road (concession 10 road) at lots 17 and 18, Huntingdon Township. Here the fault zone is a shallow depression about 14 m deep and 120 m wide, but the exact location of the main break is uncertain. A more favourable site is along concession 9 road, Hungerford Township just southeast of Buller Siding. According to Guillet, the fault crosses concession 9 road near the boundary line between lots 1 and 2, but the exact location is indefinite. A fifth site is further to the north along the road between lots 5 and 6, concession 3, Madoc Township at the O'Hara Mill Conservation Area. Here, a major fault has been mapped trending northwest as an extension of a fault line which includes the Moira fault (D.A. Williams, Geologist, Ontario Geological Survey, Tweed, personal communication, 1985).

Results presented in this report are for the first phase of detecting and locating the main fault break. The Electromagnetic (EM) and Seismic geophysical methods were employed because they appeared to have the best potential for fault locating. Results are given for the Bailey Mine site, Crookston road site, and Buller Siding site.

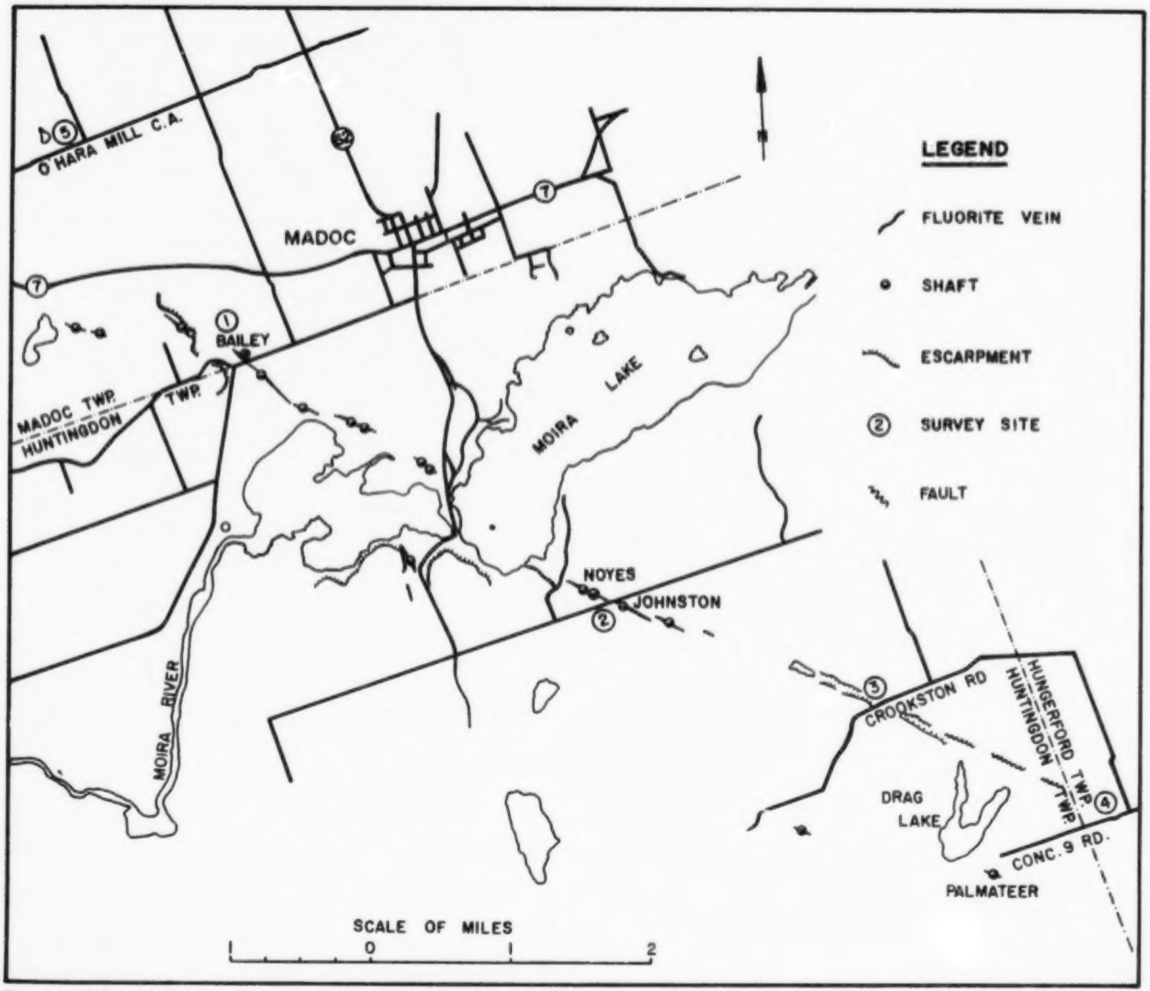
5
O'HARA MILL C.A.
62
7
MADOC
7
1
BAILEY
MADOC TWP.
HUNTINGDON TWP.
MOIRA LAKE
MOIRA RIVER
NOYES
JOHNSTON
2
3
CROOKSTON RD
HUNGERFORD TWP.
HUNTINGDON TWP.
4
DRAG LAKE
CONC. 9 RD.
PALMATEER
LEGEND
FLUORITE VEIN
SHAFT
ESCARPMENT
② SURVEY SITE
FAULT
SCALE OF MILES
1
0
1
2

Figure 13.6 . Flourite occurrences in the Madoc Area (after Guillet 1964)

EM INSTRUMENT SYSTEM

A Geonics EM-31 Terrain Conductivity Meter was borrowed from the Quaternary Geology Office, Engineering and Terrain Geology Section, Ontario Geological Survey, in December 1984 and was used on this study until May 1985. The EM-31 is a resistivity-type instrument that measures conductivity directly in millimhos per metre (mmho/m). It has a depth penetration of about 6 m. The calibration of the instrument was checked in December 1984 to read 0.15 mmho/m over a bare granite gneiss outcrop and 1.4 mmho/m over bare Bobcaygeon (previously Upper Gull River) limestone on the floor of a quarry. These were considered correct and acceptable readings. The calibration of the instrument was again checked correct in May 1985 by Geonics staff at the calibration base at the Geonics plant in Mississauga.

SEISMIC INSTRUMENT SYSTEM

A single channel engineering seismic instrument system with modifications made by the Regional Geophysicist was used on this project. The system has been described in detail in previous reports (Kingston and Papertzian 1985; Thompson 1985). Basically it consists of a Nimbus ES-125 single channel engineering seismograph, a Nimbus ESR-100 strip chart recorder and Mark Products standard 50 Hz geophones. Modifications by the Regional Geophysicist include a 12-geophone cable with take-outs at 4 m intervals, a switch box for geophone selection and provision for two preamplifiers and bandpass filter circuits, a seismic energy source that fires 12 gauge slugs into the bottom of a 1 m deep hole and computer programs for seismic data processing.

GEOLOGICAL EXAMINATIONS

D.A. Williams, Paleozoic Geologist with the Ontario Geological Survey working out of the Tweed District Office, examined several limestone outcrop areas associated with the Moira fault. In particular, he identified the Paleozoic limestone formations and horizons in the test site areas of Crookston road and Buller Siding. This information helped to locate more precisely the main break of the Moira fault. In addition, the interpretation of the survey results was done in consultation with Mr. Williams.

PRELIMINARY EM SURVEYS

Some preliminary test lines were made with the EM-31 in December 1984 and early May 1985 at the Bailey Mine site, Crookston road site, O'Hara Mill site, and Noyes-Johnston site. Some test measurements were also made over fluorite vein extensions at several old mine sites and other known vein occurrences. The only significant conductivitiy anomaly was obtained at the Bailey Mine site. As a result, the Bailey Mine site was selected for more detailed investigation.

SURVEY RESULTS—BAILEY MINE SITE

Conductivity and seismic measurements were made and test holes drilled along a survey line 168 m long, and perpendicular to the strike of the fault and fluorite vein as expressed on the surface by a deep open cut. The survey line was northwest of the surface mine workings, in a hay field, but still over the underground workings 30 m down. The line started northeast of the mine workings and ran southwesterly to the property fence.

Figure 13.7 shows the plan view of the survey line in relation to the mine workings. Also shown are the locations of diamond-drill holes put down in the early 1940s, with overburden depths, the Precambrian-Paleozoic contact as determined from drill core logs, and the location of auger test holes drilled on this survey. Figure 13.7 also shows the EM profile along the survey line as well as a bedrock depth profile determined by seismics and auger test hole depths.

Conductivity measurements were made with the EM-31 every 4 m along the survey line. The resulting conductivity profile in Figure 13.7 shows a significant anomaly over the extension of the fault and fluorite vein, and another anomaly to the southeast near the fence. Based on bedrock depths determined by seismics and test hole drilling, the conductivity anomalies simply reflect the variation in thickness of the overburden.

Six seismic refraction lines were done at different overlapping sections of the survey line. Two lines (Baily-1 and 2) were shot in one direction only, but the others were shot in both forward and reverse directions. A summary of the seismic results is given in Table 13.3.

Twelve test holes were drilled with an auger bit at different locations along the survey line to check the bedrock depth (Figure 13.7). Five holes did not reach bedrock at a depth of 4.9 m which was the limit of available drill rods.

The bedrock depth profile in Figure 13.7 shows the bedrock is generally at a shallow depth of about 4 m or less. However, there is an abrupt, marked depression over 4.9 m in depth in the bedrock surface coincident with the extension of the fault zone from the surface mine workings. The Precambrian-Paleozoic contact is at the southwestern margin of the fault depression. The Paleozoic (Shadow Lake) limestone dips gently to the southwest, but rises abruptly near the boundary fence. The fluorite vein appears to be on the southwestern margin of the fault depression in the Precambrian wacke just northeast of the Paleozoic contact.

The depression could have been caused by surface mining of the vein and backfilling. However, previous mine descriptions (Guillet 1964) indicate that only an 80-foot open cut was surface mined, which is consistent with the still remaining open cut. Also, the sequence of overburden removed in the test holes over the depression was the same as that of the other test holes. There was no evidence of infilling with gravel or rubble. For these reasons, the depression is taken to be the fault zone.

SURVEY RESULTS—CROOKSTON ROAD SITE

Conductivity and seismic measurements were made across a fault depression about 14 m deep and 130 m wide that had a northwest-southeast trend. An approximate topographic profile of the depression is shown in Figure 13.8. The southwestern side of the depression is prominently marked by a 10 m outcrop scarp in limestone identified as Lower Bobcaygeon by D.A. Williams. To the northeast, a second shallow scarp covered with overburden drops gradually another 4 m to a small creek running over exposed limestone identified as Upper Bobcaygeon by D.A. Williams. Northeast of the creek another 4 m outcrop scarp in the Upper Bobcaygeon rises to a meadow where the bedrock is covered with overburden.

An EM-31 survey line was established 30 m northwest of the property fence on the northwest side of Crookston road and approximately parallel to it. The line was 220 m long and extended from the flat-lying surface southwest of the depression to the high point of the meadow on the northeastern side. Hardly any variation in conductivity was noted over the entire line.

Due to the irregular topography, surface exposures of weathered bedrock, and dense cedar bush near the creek, seismic lines across the depression were impractical. Instead, three refraction lines were done in the direction of the strike of the depression (Figure 13.8). Only one line could be done in the fault zone depression itself. This was in a slight depression at the base of the 10 m scarp on the southwestern side. Another line was done in the meadow northeast of the depression, and a third line was done over the flat-lying limestone southwest of the depression.

Seismic depths and visual outcrops of limestone show a 2.5 m depression in the bedrock at the base of the 10 m scarp. In the meadow to the northeast, the bedrock more-or-less steps upward through one or two metres of overburden to the surface. Of significance also is the variation in velocity of the

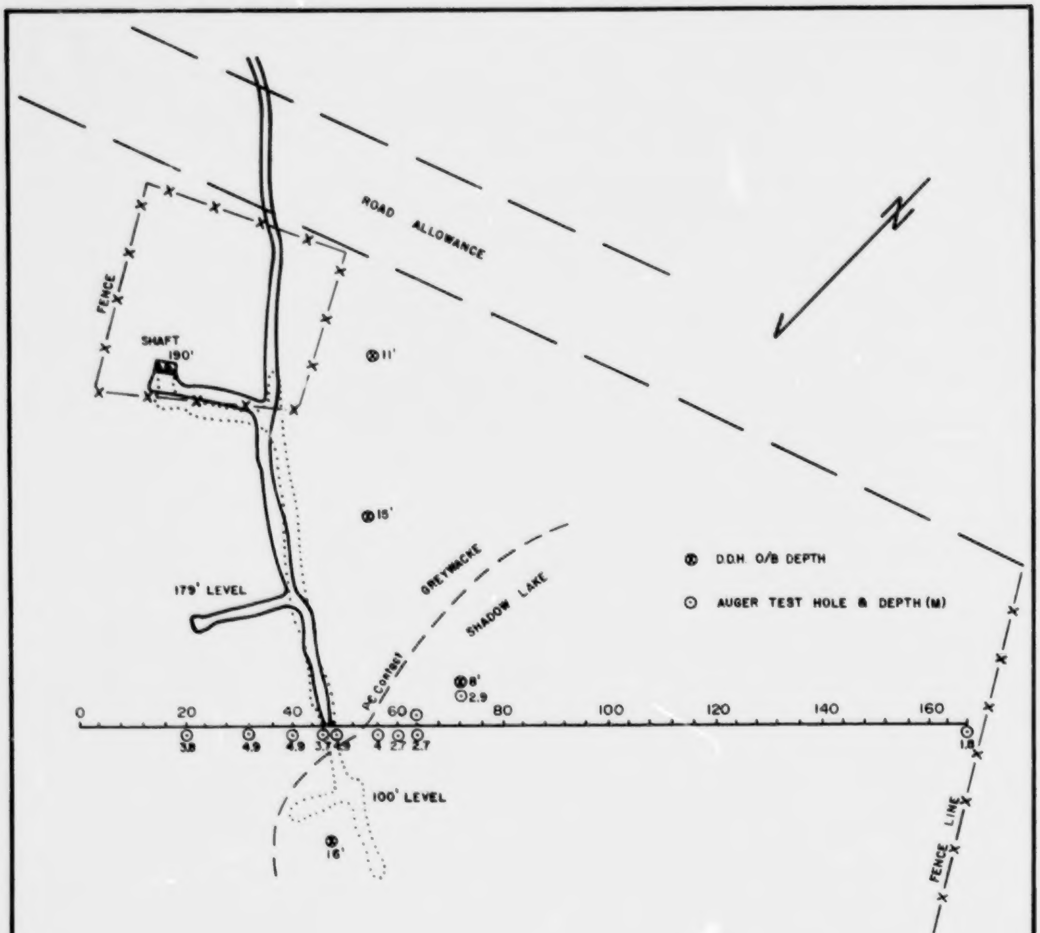
ROAD ALLOWANCE
N
FENCE
SHAFT
190'
11'
15'
179' LEVEL
GREYWACKE
SHADOW LAKE
PЄ Contact
8'
2.9
DDH. O/B DEPTH
AUGER TEST HOLE & DEPTH (M)
0
20
40
60
80
100
120
140
160
3.8
4.9
4.9
3.7
4.9
4
2.7
2.7
1.8
100' LEVEL
16'
FENCE LINE
MILLIMOHS / M
20
10
0
DISTANCE (M)
NORTH EAST
PЄ Contact
SOUTH WEST
DISTANCE (M)
0 Surface
O/C
DEPTH (M)
BEDROCK OUT OF REACH
PЄ Greywacke
Palaeozoic Shadow Lake
Fluorite Vein at 30 m
B/R BY TEST HOLE
X – B/R BY SEISMICS

Figure 13.7 . Survey results for Bailey Mine Site

TABLE 13.3 SUMMARY OF SEISMIC REFRACTION RESULTS FOR BAILEY MINE SITE.

Line No. & Direction	Line Location	Topsoil Vel. (M/S)	Clay Vel. (M/S)	Bedrock Vel. (M/S)	O/B Depth (M)	B/R Depth (M)
Bailey-1 E-W	-4 m to 44 m	250	430	2670	1	7.0
Bailey-2 W-E	144 m to 48 m	350	880	3910	1	5.5
Bailey-3 F&R	12 m to 64 m	400	720	2200	1	5.5
Bailey-4 F&R	92 m to 140 m	340	no	data		
Bailey-5 F&R	60 m to 112 m	310	810	3090	1	4.0
Bailey-6 F&R	112 m to 164	375	750	4170	1	4.5

limestone. The velocity of 3030 m/s is typical for the weathered Lower Bobcaygeon southwest of the depression. At the seismic line at the base of the 10 m scarp, the velocity is only slightly higher (3470 m/s), indicating similar limestone. The velocity of the limestone northeast of the creek (4570 m/s) is significantly higher, consistent with the thick-bedded layers of Upper Bobcaygeon found here. This indicates that the main fault break must be southwest of the creek. According to D.A. Williams, the Upper Bobcaygeon exposed in the creek is down-faulted against the Lower Bobcaygeon at the southwestern side of the zone, and likely extends under the slope southwest of the creek. The main fault break, therefore, must be close to the base of the 10 m scarp. It seems most likely that the 2.5 m depression in the bedrock at the base of the 10 m scarp is the expression of the main fault break.

SURVEY RESULTS—BULLER SIDING SITE

Conductivity and seismic measurements were made and test holes were drilled along the northwestern side of concession 9 road, Hungerford Township, from the southwestern township line northeastward across lot 1. This site is just southeast of Buller Siding. A plan of the survey line along the road is shown in Figure 13.9. The bend in the road and survey line is not accounted for in plotting the EM and seismic results. The survey line and distances are taken to be in a straight line. At the township line, the limestone bedrock outcrops in a small scarp. To the northwest near Drag Lake, the bedrock outcrops in an abrupt high ridge. This has been identified by D.A. Williams as the lower section of the Bobcaygeon Formation. Just northeast of the end of the survey line, the bedrock outcrops again in a low ridge. The survey line was 495 m long between these two outcrops. Except for the till hill shown on Figure 13.9, the bedrock depression is covered by swamp and positive identification of the fault is not possible. However, the fault has to exist somewhere along the survey line.

Guillet (1964) has mapped the fault as crossing concession 9 road on the northeast side of a prominent till ridge, at the junction with the road leading northwesterly to Buller Siding. Closer examination of outcrops and topography indicates that the fault is probably on the southwest side of the till ridge in a swamp-filled depression.

The EM-31 measurements covered only the southwestern half of the survey line. The instrument was not available to complete the northeastern portion. The EM profile in Figure 13.9 shows a broad 15 mmho/m anomaly about midway between the township line and the till hill (160 m on the survey line). From previous experience with the EM-31, this would indicate a thickening of the overburden, but this does not seem to be the case here.

Ten seismic refraction lines were done at different overlapping sections of the survey line. Line BS-1 was shot in one direction only over a distance of 144 m. The remaining 9 lines were 52 m spreads shot in both forward and reverse directions. A summary of refraction results is given in Table 13.4. Profiles of seismic depths to the different subsurface layers are shown in Figure 13.9. The seismic results indicate three layers. It must be remembered that the seismic measurements are disturbed by road bed material and infilling of the swamp with large limestone blocks. It is not possible to distinguish between places where the swamp has been filled with large limestone blocks to make a base for the road, and *in situ* weathered limestone layers. The upper 1 to 2 m layer is overburden consisting of sand, silt, and gravel. The depths are a little uncertain, due to the effect of road bed material, in the horizontal direction. Below this is a variable depth layer up to 10 m thick, mostly consisting of what appears to be broken, and/or weathered limestone, according to seismic velocities. The lower layer is competent (not weathered) *in situ* limestone, distinctly identified by much higher seismic velocities. The profile of this layer shown in Figure 13.9 is *not* a profile of the bedrock surface exactly. It could well be that some of the depressions in the profile are actually filled in part with *in situ* weathered layers.

The profile of the competent layer is significant, because it should indicate any displacement of layers by faulting. The profile does show by its depressions and irregularities that the fault is southwest of the till ridge. The main break is most likely at about 240 m on the survey line, where the competent layer drops to a depth of 12 m. There is a possible second break at about 170 m where there is a distinct drop of almost 2 m. The fault location is also indicated by

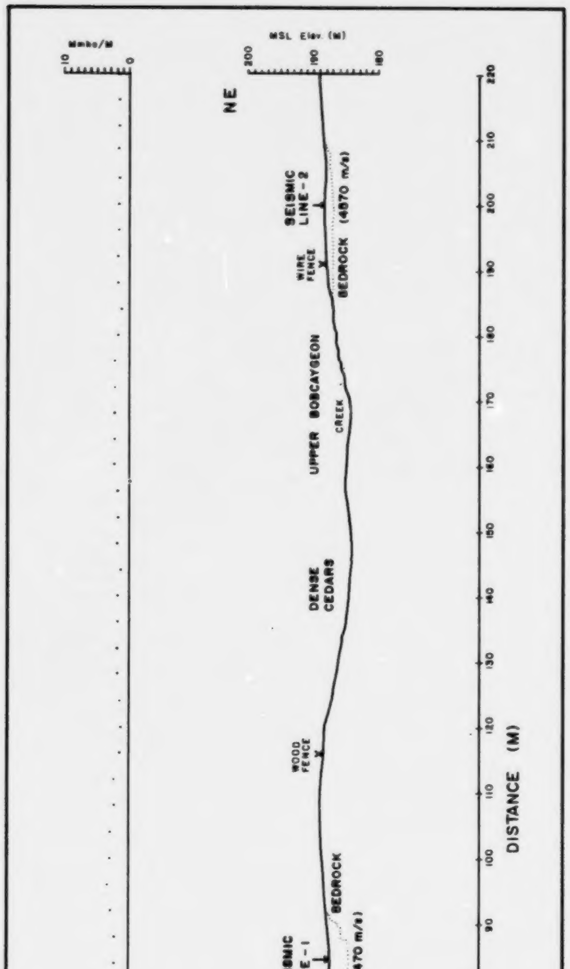

Figure 13.8 . Survey results for Crookston Road Site

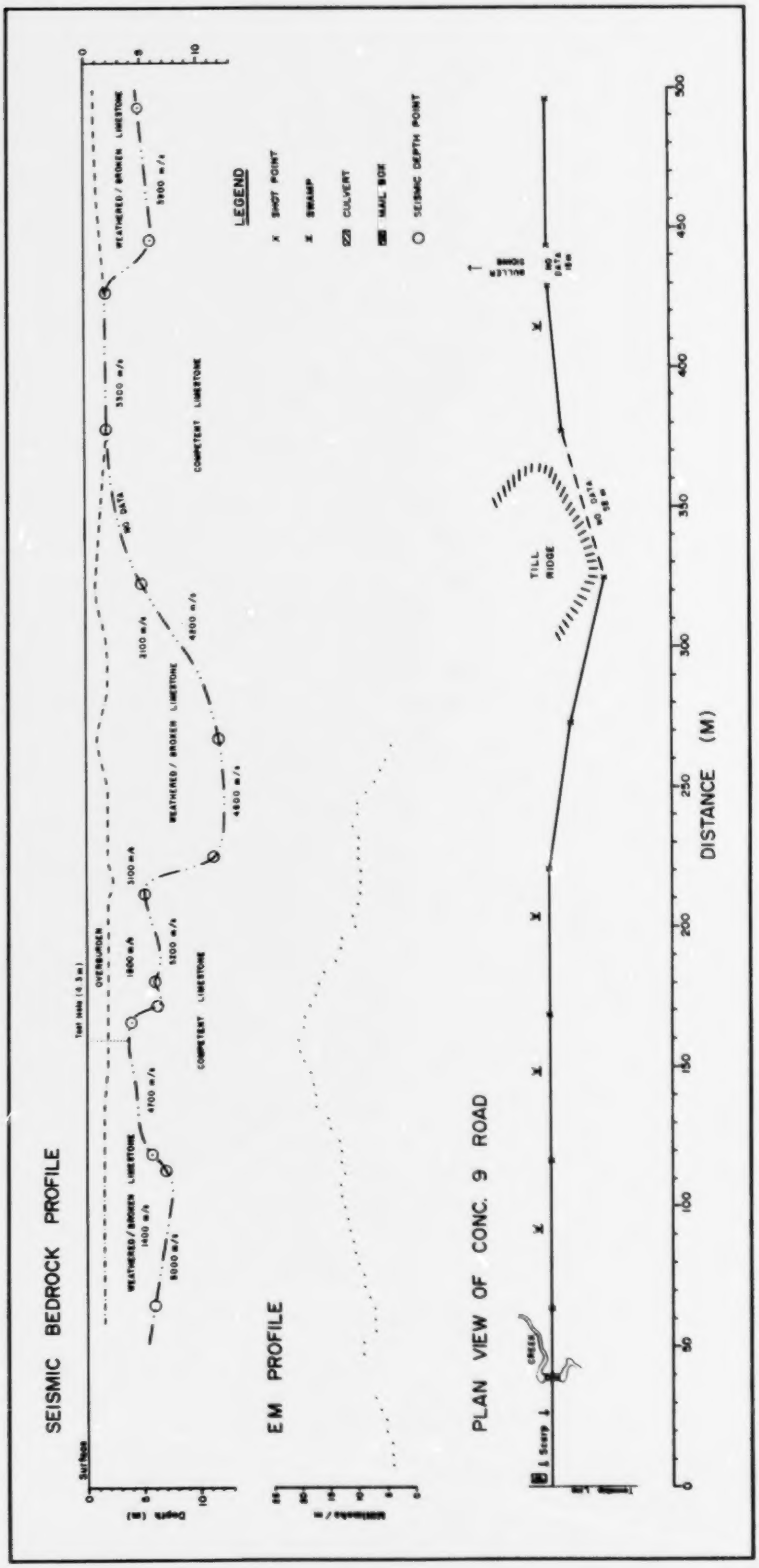

Figure 13.9 . Survey results for Buller Siding Site

TABLE 13.4 SUMMARY OF SEISMIC REFRACTION RESULTS FOR BULLER SIDING SITE.

Line No. & Direction	Line Location	Topsoil Vel. (M/S)	Weathered/ Broken Rock Vel.(M/S)	B/R Vel. (M/S)	O/B Depth (M)	B/R Depth (M)
BS-1 E-W	214 m to 70 m	610	1740	5100	1	5.5
BS-2 E-W	220 m to 168 m	730	1210	4080	2	4.0
BS-2 E-W	168 m to 220 m	560	1780	6390	2	7.0
BS-3 E-W	168 m to 116 m	770	—	5240	-	4.0
BS-3 W-E	116 m to 168 m	—	1210	4100	-	6.0
BS-4 E-W	116 m to 64 m	380	1480	5050	2	7.0
BS-4 W-E	64 m to 116 m	400	1290	4990	2	6.0
BS-5 E-W	272 m to 220 m	540	1790	4030	1	12.0
BS-5 W-E	220 m to 272 m	410	2400	5530	2	11.5
BS-6 E-W	324 m to 272 m	660	1630	4170	1	5.0
BS-6 W-E	272 m to 324 m	650	2530	—	2	—
BS-7 E-W	428 m to 376 m	380	—	3330	-	2.0
BS-7 W-E	376 m to 428 m	570	—	3190	-	2.0
BS-8 E-W	495 m to 443 m	380	890	4390	1	5.0
BS-8 W-E	443 m to 495 m	420	2220	3480	2	6.0
BS-9 E-W	252 m to 200 m	460	—	3210	-	2.0
BS-9 W-E	200 m to 252 m	360	—	3600	-	2.0
BS-10 E-W	200 m to 148 m	370	2680	—	2	—
BS-10 W-E	148 m to 200 m	300	1430	5470	2	6.0

TABLE 13.5 LICENCED PITS AND QUARRIES IN NAPANEE, TWEED, AND BROCKVILLE DISTRICTS*

District	Licenced Quarries	Licenced Pits	Licenced Quarries and Pits	Total	Licenced Hectarage
Napanee	39	139	5	183	4190
Tweed	11	56	1	68	1476
Brockville	23	5	3	106	2863
Totals	73	200	9	337	8534

*Only a portion of both Tweed and Napanee Districts are designated under the Pits and Quarries Control Act.

the seismic velocities of the competent layer. Southwest of the 12 m depression, the seismic velocity is about 5000 m/s, indicating solid thick-bedded layers. Northeast of the depression, the velocity decreases to about 4000 m/s or less, indicating a different sequence of limestone layers.

A test hole was drilled at 160 m on the survey line, where the competent layer was closest to the surface. Bedrock was encountered at a depth of 4.3 m, in agreement with the seismic depth. This confirms that the competent layer is actually the bedrock surface at this point. Test holes drilled at 272 m and 220 m on the survey line, encountered large rocks at depths of 0.3 to 0.5 m.

CONCLUSIONS

1. Phase 1 of this project (i.e. to detect the main fault break at sites where the Moira fault zone is known to exist) has been successful in that the main fault break has been located at three sites. At the Bailey Mine site, the location of the known fault was identified. At the Crookston road site and the Buller Siding site, the fault break was more precisely located within broad depressions.
2. The EM-31 primarily reflects overburden depth and is not useful for fault or fluorite vein detection. In future survey work, a deep penetrating EM system like the Geonics EM-34, or conventional resistivity equipment should be used.
3. The seismic method proved successful for locating and identifying the main fault break. Seismic depth profiling located the fault depression and seismic velocities identified different rock types on each side of the fault.
4. At the sites tested, the main fault break is close to, or at the base of, an abrupt scarp in limestone which marks the southwestern margin of the fault zone depression.
5. The results are encouraging and continuation of the project is warranted.

TABLE 13.6 REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATORS IN NAPANEE DISTRICT UNDER THE PITS AND QUARRIES CONTROL ACT

Township	1981 Tonnes	1982 Tonnes	1983 Tonnes	1984 Tonnes
Ameliasburgh	60 036	20 324	12 131	30 863
Athol	40 801	49 824	50 348	63 243
Brighton	197 780	266 578	184 546	204 937
Cramahe	1 548 672	1 275 435	1 035 460	1 612 567
Hallowell	45 918	19 324	44 099	23 925
Hillier	19 737	42 301	15 295	12 392
Kingston	498 984	592 636	745 439	804 718
Murray	343 251	263 683	436 159	261 398
North Marysburgh	1 745	2 421	3 725	5 766
Percy	77 138	47 567	71 751	86 825
Pittsburgh	161 848	118 657	151 027	188 962
Rawdon	8 902	18 058	7 602	10 780
Seymour	148 234	139 230	162 856	127 802
Sidney	469 407	342 686	267 040	360 653
Sophiasburgh	560 394	1 226 317	1 331 520	1 536 088
South Marysburgh	3 223	1 740	511	1 009
Thurlow	192 852	97 370	127 832	87 156
Tyendinaga	144 085	132 466	146 804	198 246
Totals	4 559 007	4 656 617	4 801 145	5 617 330

TABLE 13.7 REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATORS IN BROCKVILLE DISTRICT UNDER THE PITS AND QUARRIES CONTROL ACT

*Township	**1981 Tonnes	1982 Tonnes	1983 Tonnes	1984 Tonnes
Elzevir	6 963	1 830	19 254	2 011
Grimsthorpe	-	-	-	-
Hungerford	86 507	161 715	107 967	102 960
Huntingdon	43 645	98 185	108 350	157 006
Lake	761	333	1 590	1 845
Madoc	15 711	31 605	51 854	45 363
Marmora	10 451	22 303	36 012	25 388
Tudor	-	-	-	-
Totals	164 038	315 971	325 027	334 575

*Denotes geographic townships
**The 1981 totals are for the second half of that year, July 1-December 31.

PITS AND QUARRIES OF NAPANEE, TWEED, AND BROCKVILLE DISTRICTS by Stuart M. Thatcher[1]

The Mineral Resources staff in Napanee commented on numerous severances, zoning by-laws, official plans, and amendments to the official plans and by-laws throughout the three districts. These dealt with the protection of viable aggregate reserves from incompatible land uses, and to ensure that proposed land use development would not preclude or hinder extraction. A total of 97 planning proposals were reviewed and received comment.

In 1985, 29 new applications were processed under the Pits and Quarries Control Act, bringing the three districts' total to 357 licenced pits and quarries. Table 13.5 shows the distribution of licenced pits and quarries and the licenced hectarage in those townships designated under the Pits and Quarries Control Act. The inspectors were heavily involved in processing 17 applications alone in Storrington Township, which was designated under the Act on July 1, 1984. However, the majority of the licences were issued in the fall of 1985.

A total of 73 townships are under the administrative responsibility of Napanee, with 42 townships being designated under the Act. Tables 13.6, 13.7, and 13.8 give the reported production figures for licenced operators in designated areas.

ABANDONED PITS AND QUARRIES STUDY

The abandoned pit and quarry study continued into 1985 with Prince Edward County being completed, along with Pittsburg Township. Table 15.9 shows the number of sites inventoried. These sites were then rated as (a) depleted, (b) moderate, or (c) substantial

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[1] Mineral Resources Supervisor, Napanee, Tweed, and Brockville Districts, Ontario Ministry of Natural Resources, Tweed

TABLE 13.8 REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATORS IN BROCKVILLE DISTRICT UNDER THE PITS AND QUARRIES CONTROL ACT

Township	1981 Tonnes	1982 Tonnes	1983 Tonnes	1984 Tonnes
Augusta	88 792	171 867	75 316	138 376
Bastard	4 558	629	8 217	3 210
South Burgess	5 098	2 166	7 979	10 408
North Crosby	3 119	70 728	67 951	31 472
Edwardsburgh	2 223	12 389	6 186	3 630
Elizabethtown	170 729	226 522	227 468	373 464
South Elmsley	500	20 283	7 242	12 085
South Gower	47 521	14 780	33 558	56 190
Kitely	2 026	17 979	28 104	9 442
Front of Leeds and Lansdowne	11 232	34 988	53 274	44 290
Rear of Leeds and Lansdowne	188 751	306 628	309 935	340 678
Oxford-on-Rideau	2 751	4 486	5 192	3 873
Wolford	14 719	73 114	179 212	140 608
Front of Yonge	8 593	7 151	4 373	4 223
Rear of Yonge and Escott	47 710	105 705	114 943	125 986
Totals	598 322	1 069 415	1 128 950	1 297 935

TABLE 13.9 ABANDONED PITS AND QUARRIES STUDY

Township	County	Pits	Quarries
Abinger	Lennox & Addington	10	-
Adolphustown	Lennox & Addington	4	1
Ameliasburg	Prince Edward	14	5
Amherst Island	Lennox & Addington	-	2
Anglesea	Lennox & Addington	16	1
Ashby	Lennox & Addington	1	-
Athol	Prince Edward	6	1
Brighton	Northumberland	48	-
Cramahe	Northumberland	32	-
Camden East	Lennox & Addington	29	10
Effingham	Lennox & Addington	8	-
Ernestown	Lennox & Addington	18	29
Hallowell	Prince Edward	14	5
Hillier	Prince Edward	9	4
Huntingdom	Hastings	22	1
Kaladar	Lennox & Addington	24	-
Murray	Northumberland	27	3
North Fredericksburgh	Lennox & Addington	7	9
North Marysburgh	Prince Edward	-	12
Percy	Northumberland	35	-
Pittsburgh	Frontenac	14	5
Rawdon	Hastings	28	1
Richmond	Lennox & Addington	12	5
Seymour	Northumberland	35	1
Sheffield	Lennox & Addington	39	-
Sidney	Hastings	49	1
Sophiasburgh	Prince Edward	4	50
South Fredericksburgh	Lennox & Addington	6	9
South Marysburgh	Prince Edward	3	10
Storrington	Frontenac	35	15
Thurlow	Hastings	19	1
Totals		568	181

reserves. This information is invaluable when commenting on plan input and review proposals, and an asset for aggregate companies seeking properties for future development of a pit or quarry.

TABLE 13.10 INACTIVE HAZARDOUS MINE SITE INVENTORY - NAPANEE AND TWEED DISTRICTS

	Shafts	Trenches	Pits
Napanee District Townships			
Bedford	23	4	49
Loughborough	8	1	20
Pittsburgh	-	-	2
Portland	-	1	9
Storrington	1	-	4
Sub Total	32	6	82
Tweed District Townships			
Barrie	10	4	8
Camden East	-	1	-
Elzevir	3	-	-
Grimsthorpe	1	-	-
Hinchinbrooke	6	3	13
Hungerford	3	-	-
Huntingdom	27	5	10
Kaladar	2	-	4
Kennebec	-	1	5
Lake	2	-	3
Madoc	14	16	22
Marmora	17	1	11
Olden	4	2	20
Oso	-	-	6
Palmerston	1	1	5
Sheffield	2	1	4
Tudor	2	-	6
Sub Total	114	35	117
TOTALS	146	41	199

INACTIVE HAZARDOUS MINE SITE INVENTORY

Over 100 sites in Frontenac and Hastings Counties were inventoried and evaluated as part of our ongoing program to determine if a site is hazardous, and to recommend remedial action when funds are available.

To date, 379 sites have been investigated since the inception of the program in 1983. In 1985, four sites in Frontenac Provincial Park were fenced to prevent inadvertent access by park users. These sites were old worked-out mica deposits. Table 13.10 summarizes the number of sites inspected and classified into three categories.

MINERAL RESOURCES—CARLETON PLACE AND CORNWALL DISTRICTS

The Pit and Quarry staff of Carleton Place District consists of M.A. MacDonald, Mineral Resources Supervisor, and A. Giles and T. McManus, inspectors.

Carleton Place District encompasses all of Lanark County and the Regional Municipality of Ottawa-Carleton, with a land base consisting of 563 521 hectares and 22 geographical townships.

The Mineral Resources staff are employed on many projects improving and speeding up rehabilitation on all pits and quarries. Annual reviews of all licenced properties are a high priority. Staff comment on all aspects of plan review and ensure that townships are updated on mineral resources potential within their respective boundaries.

There are many abandoned pits and quarries in the district, and no remedial action has been taken to date on inactive hazardous mines and shafts, due to financial constraints.

Table 13.11 lists the total number of licenced quarries, pits, and pits and quarries, in Carleton Place District, and Table 13.12 lists the reported production of aggregate by Township for 1981, 1982, and 1983.

The pit and quarry staff of Cornwall District consists of B.W. McCue, District Lands and Mineral Resources Supervisor, and D. Willis, Inspector.

Cornwall District works closely with municipalities and the Ministry of Municipal Affairs and Housing at both the plan input and review stages to ensure that mineral resource activities are considered in the planning process (severences, subdivisions, official plans, zoning by-laws, etc.)

Table 13.13 lists the number of licenced pits, quarries, and pits and quarries by county and township for 1985.

Table 13.14 lists the aggregate production from licenced pits and quarries for 1984 from Cornwall District.

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TABLE 13.11 NUMBER OF LICENCED PITS AND QUARRIES FOR CARLETON PLACE

District	Licenced Quarries	Licenced Pits	Licenced P & Q
Carleton Place	34	167	5

TABLE 13.12 REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATORS IN CARLETON PLACE DISTRICT UNDER PITS & QUARRIES CONTROL ACT

Township	1981 Tonnes	1982 Tonnes	1983 Tonnes
Almonte, Town of	326.50	230.38	375.00
Bathurst, Township of	6 814.96	27 360.00	9 022.30
Beckwith, Township of	1 030.28	23 044.86	51 087.00
Cumberland, Township of	78 603.72	219 740.34	216 802.49
Dalhousie, Township of	13 013.21	61 253.85	69 271.02
Darling, Township of	80 397.32	149 836.00	94 542.20
Drummond, Township of	4 645.76	3 594.00	7 005.36
Gloucester, City of	1 738 640.30	2 141 273.39	2 750 505.76
Goulbourn, Township of	162 027.22	258 102.20	100 402.30
Lanark, Township of	113 451.10	109 369.72	200 351.81
Lavant, Township of	3 865.24	1 746.00	2 132.48
Montague, Township of	37 691.70	21 179.62	36 845.91
Nepean, City of	1 234 232.44	1 435 372.00	2 366 495.83
N. Elmsley, Township of	15 432.16	17 979.00	13 251.00
N. Sherbrooke, Township of	19 048.65	27 250.47	12 502.29
Osgoode, Township of	464 728.40	359 568.22	391 625.64
Ottawa, City of	109 134.00	44 992.00	Nil
Pakenham, Township of	n/a	735.00	660.00
Ramsay, Township of	3 260.00	12 962.10	13 770.00
Rideau, Township of			
Marlborough Ward	123 750.00	3 052.00	4 528.80
North Gower Ward	37 557.60	29 932.00	20 610.00
S. Sherbrooke, Township of	2 684.56	8 881.50	7 308.64
West Carleton, Township of			
Fitzroy Ward	14 089.40	29 413.00	29.839.12
Huntley Ward	625 245.55	560 293.59	995 340.95
Torbolton Ward	46,971.00	95,304.00	42 220.48

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TABLE 13.13 LICENCED PITS, QUARRIES, AND PITS/QUARRIES FOR 1985, CORNWALL DISTRICT

County/ Township	Licenced Pits	Licenced Quarries	Licenced Pit/Quarries	Total
A. STORMONT COUNTY				
1. Osnabruck Tp.	16	2	0	18
2. Cornwall Tp.	32	4	0	36
3. Roxborough Tp.	23	3	0	26
4. Finch Tp.	6	4	1	11
Subtotal				91
B. DUNDAS COUNTY				
1. Mathilda Tp.	7	2	0	9
2. Mountain Tp.	9	4	0	13
3. Williamsburgh Tp.	0	3	0	3
4. Winchester Tp.	8	1	0	9
Subtotal				34
C. GLENGARRY COUNTY				
1. Lancaster Tp.	1	1	0	2
2. Lochiel Tp.	5	0	0	5
3. Charlottenburgh Tp.	4	1	0	5
4. Kenyon Tp.	14	3	0	17
Subtotal				29
D. PRESCOTT COUNTY				
1. Alfred Tp.	6	1	0	7
2. N. Plantagenet Tp.	6	0	0	6
3. S. Plantagenet Tp.	3	2	0	5
4. Longueuil Tp.	0	1	0	1
5. Caledonia Tp.	1	2	1	4
6. W. Hawkesbury Tp.	17	0	0	17
7. E. Hawkesbury Tp.	6	1	0	7
Subtotal				47
E. RUSSELL COUNTY				
1. Clarence Tp.	12	1	0	13
2. Russell Tp.	2	5	0	7
3. Cambridge Tp.	6	1	0	7
Subtotal				27
GRAND TOTAL				228

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TABLE 13.14 AGGREGATE PRODUCTION FROM LICENCED PITS AND QUARRIES DURING THE YEAR 1984 CORNWALL DISTRICT

County	Townships	Number of Licenced Pits and Quarries**	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)**	Total (Tonnes)
Stormont	Cornwall		40 371.88	498 925.00		533 296.88
	Finch		29 520.16	59 725.38		89 245.54
	Osnabruck		22 208.79	35 633.81		57 842.60
	Roxborough		92 698.58	144 110.62		236 809.20
Dundas	Matilda		7 272.00	21 633.00		28 905.00
	Mountain		196 766.75	2 844.00		199 610.75
	Winchester		79 470.39	30 517.00		109 987.39
	Williamsburgh		Nil	109 075.00		109 075.00
Glengarry	Charlottenburgh		1 333.00	Nil		1 333.00
	Kenyon		46 771.78	874.34		47 646.12
	Lancaster		4 500.00	123 438.00		127 938.00
	Lochiel		12 812.00	Nil		12 812.00
Prescott	Alfred		48 136.00	1 520.32		49 656.32
	Caledonia		8 981.44	23 773.45		32 754.89
	E. Hawkesbury		*42 449.88	19 266.00		61 715.88
	W. Hawkesbury		45 129.72	Nil		45 129.72
	Longueuil		Nil	206 678.00		206 678.00
	N. Plantagenet		18 165.20	Nil		18 165.20
	S. Plantagent		48 812.24	14 026.00		62 838.24
Russell	Cambridge		59 391.91	40 936.00		100 327.91
	Clarence		132 860.89	110 096.00		242 956.89
	Russell		139 919.70	56 817.70		196 737.40
	Total for 1984					2 577 461.93

*N.B. (Pilon pit borders on E & W Hawkesbury Townships - recorded under East Hawkesbury)
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1985b: Paleozoic Geology of the Winchester Area; Ontario Geological Survey, Map P.2721, Geological Series-Preliminary Map, scale 1:50 000.
1985c: Paleozoic Geology of the Morrisburg Area; Ontario Geological Survey, Map P.2722, Geological Series-Preliminary Map, scale 1:50 000.

14. Central Regional Geologist Area, Central Region

Mahendra Narain[1] **and Jackie Burkart**[2]

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INTRODUCTION

During 1985, the Central Regional Geologist placed greater emphasis on further assessment and development of the Region's aggregate, building stone, clay, and shale resources. This was as a result of a growing interest in building stone products, quality aggregates, ceramic wall and floor tiles, and roofing tiles. Several new projects have been initiated to improve data on the resources to better serve potential investors.

Geoscience information and consultative services were provided by the Regional Geologist's office at Richmond Hill, and by the five district offices at Fonthill, Maple, Lindsay, Cambridge, and Midhurst. Various provincial government agencies, the aggregate industry, private consulting firms, mining companies, and the general public were some of the typical user groups. Requests for these services related to mining and petroleum resources, alloy materials, specialty aggregates, etc. More interest was indicated in mining-related investment opportunities in the Central or neighbouring regions.

The mineral resources outlook remains optimistic in Central Region, with an increase reported in both aggregate and gypsum production in 1985. The Region has 867 licenced pits and quarries and 3 gypsum mines.

Inter-program and inter-ministry consultations have been increasing at both the regional and district levels. The Regional Geologist continued to administer geological programs related to geoscience information, data collection, and mineral resource management. Technical direction and support was provided for District Mineral Resource Programs.

Current staff at the Regional office includes: Martin Groneng, Regional Lands and Mineral Resources Coordinator; Jackie Burkart, Resource Geologist; and June Feeney and Barbara Crowe, Secretaries.

Geological staff at the district offices include: John Frazer, Niagara; Amar Mukherjee, Maple; Tom Cumby, Lindsay; Bill Fitzgerald, Huronia; and Don Routly, Cambridge.

REGIONAL GEOLOGIST'S ACTIVITIES

RESOURCES AND LAND USE PLANNING

A large part of the Regional Geologist's time was spent coordinating several mineral resources projects in the Region. A study to assess the suitability of clay and shale resources of the Central Region for brick and tile manufacture was initiated in 1984. This was done in response to several inquiries from potential investors looking for suitable resources. In 1985, the study was expanded to include the suitability of selected clays and shales of Central and Southwestern Regions of the Ministry of Natural Resources. Samples representing shales of the Blue Mountain, Georgian Bay, Queenston, Cabot Head, and Arkona units, two Pleistocene glaciolacustrine clays, and one recent alluvial clay were collected and tested. Laboratory testing was carried out by a private consulting firm at the CANMET Lab in Ottawa and in the Land Resource Science Labs at the University of Guelph. All sampling and testing has been completed and the first draft of the report is under review. Study results have been very encouraging, and several sites were found to have suitable resources. The 1984 study is now available as Open File Report 5571 (Kwong *et al.* 1985). The 1985 study will be available as an Open File Report in early 1986.

The Regional Geologist assisted the district offices in the planning and implementation of aggregate resources evaluation projects. These projects were designed to collect data to promote conservation and proper utilization of the Region's mineral resources, and to assist both levels of municipal governments in their planning processes.

The Regional Geologist conducted a preliminary examination of licenced quarries and unlicenced sites for potential building stone resources. Some samples from sites in Lindsay, Cambridge, and Maple Districts were collected, cut, and polished, to determine the quality of the rock as a building stone. The results of this survey have been encouraging and more extensive examination and testing of these resources is planned for 1986.

Another project has been initiated to reassess the Region's potentially available aggregate resources. All of the mineral aggregate areas identified in the district guidelines are being re-evaluated with the intention of creating a more accurate inventory of our Region's potentially available aggregate resources. This assessment involves researching Ministry of the Environment water well records, Ministry of Transportation and Communications data on tested properties, data collected by the Aggregate Assessment Office, and hopefully some field testing of selected aggregate areas in 1986. The new data would aid ministry staff in plan input and review functions, as well as help regional municipalities update mineral aggregate information in their official plans.

An inventory of all past and present mineral commodities in Central Region was undertaken in 1984 and 1985. The inventory is in the form of a map, locating all of the past and present oil and gas and mineral related activities. The map, with notes, is expected to be available in Summer, 1986.

CONSULTATION AND EDUCATIONAL SERVICES

The Central Region office and its five district offices continued to provide consultation services related to geology, mineral resources, and legislation. Some of the various inquiries were related to mineral rights, claim staking, and mining and minerals in general. Following are some of the beneficiaries of geological and mineral resource inputs made by Regional and District staff: local and regional municipalities, Ministry of Transportation and Communications for their

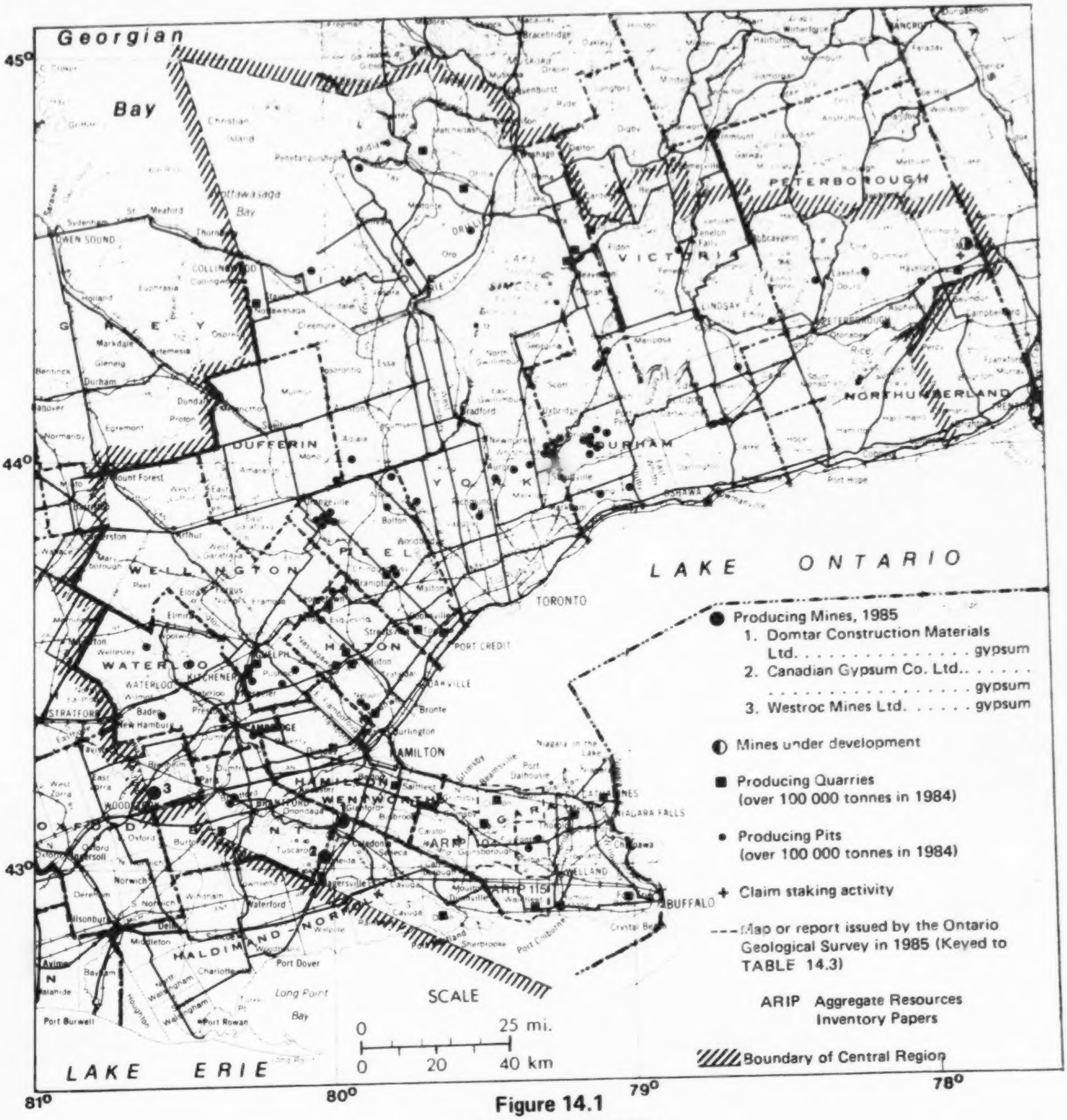
Georgian Bay
Nottawasaga Bay
LAKE ONTARIO
LAKE ERIE
Long Point Bay
TORONTO
HAMILTON
BUFFALO
GREY
DUFFERIN
SIMCOE
VICTORIA
PETERBOROUGH
NORTHUMBERLAND
DURHAM
YORK
PEEL
WELLINGTON
WATERLOO
HALTON
HAMILTON-WENTWORTH
NIAGARA
BRANT
OXFORD
HALDIMAND-NORFOLK
ARIP 102
ARIP 115
1
2
3
45°
44°
43°
81°
80°
79°
78°
SCALE
0
25 mi.
0
20
40 km
● Producing Mines, 1985
1. Domtar Construction Materials Ltd. . . . . gypsum
2. Canadian Gypsum Co. Ltd.. . . . . gypsum
3. Westroc Mines Ltd. . . . . . gypsum
◐ Mines under development
■ Producing Quarries (over 100 000 tonnes in 1984)
• Producing Pits (over 100 000 tonnes in 1984)
+ Claim staking activity
--- Map or report issued by the Ontario Geological Survey in 1985 (Keyed to TABLE 14.3)
ARIP Aggregate Resources Inventory Papers
▨ Boundary of Central Region

Figure 14.1
CENTRAL REGION

TABLE 14.1 LICENCED PITS AND QUARRIES IN THE CENTRAL REGION

District	Licenced Quarries	Licenced Pits
Maple	10	137
Niagara	20	15
Lindsay	14	243
Cambridge	22	211
Huronia	9	186
Total	75	792

aggregate sources lists, township aggregate inventories of the Ontario Geological Survey, Ministries of Labour, Environment, Agriculture, Housing, the Conservation Authorities, Ontario Hydro, and the Niagara Escarpment Commission.

Central Region, in conjunction with the Ontario Geological Survey, organized and erected a natural building stone display at the Woodfire '85 Exhibition at Malton in May, and at the Toronto Home and Do-It-Yourself Show in October. The display, which included many of the natural stones of Ontario, as well as ceramic tiles, was set up in response to a renewed interest and increasing demand for natural building stone products. Public interest in building stone, and response to the exhibit, were immensely encouraging.

District staff arranged various geological and mineral resource related displays, tours, and seminars for numerous groups such as geological and mineral clubs, junior rangers, high school and post-secondary students, ministry personnel, pit and quarry operators, and other interest groups.

PROPERTY EXAMINATIONS

The Regional Geologist along with district, main office, and Southwestern Region staff, and consultants, examined and sampled several clay and shale deposits in Central and Southwestern Regions.

The Regional Geologist accompanied Lindsay District staff on a field trip to identify potential hazards in areas of past mining and exploration activity in Belmont and Harvey Townships.

District staff have conducted extensive field evaluations of both licenced and other resource areas, and this work will continue for several years to ensure availability of resources, and to determine their quality and quantity for possible extraction.

GEOLOGY AND MINING–RELATED ACTIVITIES

Central Region boasts a wealth of mineral resources which includes sand and gravel, limestone, dolostone, sandstone, shale, clay, gypsum, traprock, peat, and even some gold and oil and gas. A small amount of sulphur is produced in Cambridge and Maple Districts as a by-product of oil and gas refineries. The majority of minerals produced in Central Region are used in the manufacturing and construction industry, and the Region maintains its status of being the largest producer of structural materials in the Province.

Approximately 56.2 million tonnes of aggregate materials were produced in the Region in 1984, a 17.5% increase over 1983 production. The consistent improvement in production is due to improved economic conditions in the construction industry. The aggregate industry is even more optimistic about their outlook for 1986.

The Fairmont Granite Quarry in Belmont Township reports a nil production for 1985. Operation of the quarry was suspended in 1984 due to excessive fracturing of the stone with increasing depth. No gold production was reported for 1985 by Lasir Gold Incorporated at the Cordova Mines in Belmont Township.

Gypsum is produced at three locations within the Region: Drumbo, Hagersville, and Caledonia. Production at these gypsum mines has been improving considerably over the past years; one company has expansion plans well under way, and a new shaft is expected to open in 1986.

Following are highlights of some of the mineral producers and consulting firms within Central Region, as reported by the respective companies.

LASIR GOLD INCORPORATED, TORONTO

Lasir Gold Incorporated has entered into a joint venture syndicate agreement with an Ontario private company, 589026 Ontario Incorporated (CWT Division). CWT Division has a long term renewable contract with the City of Toronto to remove the Sewage Sludge Incinerator Ash (SSIA) from the storage lagoons at Ashbridges Bay on the Toronto harbour front. Ministry of the Environment (MOE) approvals to remove the SSIA from Ashbridges Bay, process it, and dispose of the residue, are being negotiated. Early approvals are anticipated.

A processing plant site on the harbour front, on property owned by the Harbour Commission and subleased from Esso Canada Limited is being readied for the installation of the processing facilities to treat the SSIA for the recovery of the contained precious metals. Gold and silver will be recovered by conventional leaching methods. Average values from sampling done by Noranda Incorporated of the SSIA in the lagoons are reported as 0.15 ounce gold per ton and 7.89 ounces silver per ton. Between 80 and 100 tons of SSIA are produced on a daily basis at Ashbridges Bay. Additionally, there are some 100 000 tons on hand which must be treated and disposed of to enable the continued storage of SSIA being produced. Accordingly Lasir Gold, as the operator, proposes to treat SSIA on the premises subleased from Esso Canada at the rate equivalent of 300 tons per day.

Plans to complete the plant at the company's Cordova Mines location to enable the treatment of some 70 000 tons of old stamp mill tailings grading 0.04 ounce gold per ton are underway so that a start-up can be made early in 1986. Plant completion costs are estimated to be in the order of $180 000, with operating costs estimated at $6 per ton. Income generated from the Cordova Mines plant will be 100% for Lasir Gold's account. There are under-

TABLE 14.2 REPORTED AGGREGATE PRODUCTION BY TOWNSHIP FROM LICENCED OPERATIONS IN CENTRAL REGION

LINDSAY DISTRICT

Township	1982 Tonnes	1983 Tonnes	1984 Tonnes
Alnwick	58,921	38,053	31,877
Asphodel	380,582	328,700	584,534
Belmont	366,670	325,508	343,507
Bexley-Carden	449,366	635,101	815,370
Cavan	42,878	55,196	39,623
Douro	37,358	14,118	38,041
Dummer	225,442	188,211	217,245
Eldon	42,827	91,525	23,451
Emily	202,945	359,843	366,801
Ennismore	53,884	62,164	23,283
Fenelon	289,506	419,557	354,931
Haldimand	76,340	104,402	148,245
Hamilton	288,694	198,793	286,118
Harvey	38,434	27,983	34,428
Hope	165,872	33,235	74,195
Manvers	1,644,096	1,660,671	2,610,510
Mariposa	202,229	174,228	154,568
Town of Newcastle:			
Former Twp. of Clarke	145,787	148,095	177,864
Former Twp. of Darlington	803,730	778,239	874,304
North and South Monaghan	11,696	7,926	7,880
Ops	1,172	6,054	16,082
City of Oshawa	8,016	5,764	7,609
Otonabee	90,285	97,496	93,970
Scugog:			
Former Twp. of Cartwright	52,161	49,404	121,896
Former Twp. of Reach	761,387	754,129	977,542
Smith	304,710	409,775	336,763
Verulam	87,572	130,128	97,440
Whitby	115,306	113,298	168,964
TOTALS	7,048,026	7,227,636	9,027,031

NIAGARA DISTRICT

Township	1982 Tonnes	1983 Tonnes	1984 Tonnes
Town of Dunnville	213,400	219,226	281,773
Town of Fort Erie	255,000	117,902	241,888
Town of Haldimand	811,000	900,511	1,235,302
Town of Lincoln	966,900	979,354	1,032,300
City of Niagara Falls	23,800	39,287	36,023
Town of Niagara-on-the-Lake	328,700	380,225	404,328
Town of Pelham	482,200	565,354	468,574
City of Port Colborne	181,770	431,075	614,641
Township of Wainfleet	412,900	474,512	336,161
City of Thorold	698,900	653,054	796,954
TOTALS	4,374,570	4,820,500	5,447,944

TABLE 14.2 Continued

HURONIA DISTRICT

Township	1982	1983	1984
	Tonnes	Tonnes	Tonnes
Adjala	552,880	636,466	790,522
Amaranth	117,666	117,365	114,000
Essa	23,074	32,462	59,819
Flos	152,895	147,352	145,257
East Garafraxa	71,927	81,081	167,209
West Gwillimbury	21,790	37,183	15,415
Innisfil	131,381	145,636	413,803
Mara	587,903	832,088	1,072,679
Matchedash (included in Orillia figures)			
Medonte	374,445	99,307	122,608
Melancthon	47,239	25,775	69,195
Mono	301,171	553,424	385,692
Mulmur	55,109	89,502	61,828
Nottawasaga	195,404	270,799	289,260
Orillia (includes figures for Matchedash)	1,757,468	1,717,137	2,207,835
Oro	474,913	374,850	563,228
Rama	272,209	103,677	198,523
Sunnidale	234,249	202,766	160,594
Tay	297,053	464,679	536,614
Tecumseth	42,036	46,237	44,119
Tiny	137,004	201,974	192,893
Tosorontio	66,311	122,071	181,979
Vespra	284,949	274,063	612,177
TOTALS	6,199,074	6,575,894	8,405,249

MAPLE DISTRICT

Brock	998,490	1,305,531	1,204,874
Pickering/Ajax	388,879	257,071	277,978
Uxbridge	2,402,183	3,533,939	3,047,185
Brampton	747,327	625,186	644,576
Caledon	3,897,251	3,885,899	4,352,875
Mississauga	-	-	-
East Gwillimbury	122,515	193,850	192,762
East York	-	-	-
Georgina	214,843	320,787	293,379
King	159,827	254,619	170,059
Markham	-	-	-
Richmond Hill (included in Whitchurch-Stouffville figures)			
Vaughan	436,203	695,152	992,230
Whitchurch-Stouffville (includes Richmond Hill figures)	2,841,961	2,032,854	2,887,461
TOTALS	12,209,479	13,104,888	14,063,379

TABLE 14.2 **Continued**

CAMBRIDGE DISTRICT

Township	1982 Tonnes	1983 Tonnes	1984 Tonnes
City of Brantford	334,080	391,437	460,037
Brantford/Onondaga	402,859	437,688	553,919
South Dumfries	43,615	45,012	30,109
Ancaster	55,950	30,438	29,395
Flamborough	2,059,260	2,070,116	2,502,051
Stoney Creek	311,099	463,435	538,451
Blenheim	117,207	182,607	71,561
North Dumfries	554,525	759,142	1,011,701
Wellesley	344,773	461,370	466,461
Wilmot	190,068	207,181	491,996
Cambridge) Kitchener) Waterloo)	535,244	362,480	684,458
Woolwich	317,193	675,058	586,672
Arthur/West Luther	101,496	89,967	83,107
Maryborough	65,803	89,421	48,234
Peel	25,025	6,502	915
Nichol	-	-	-
Pilkington	287,852	244,429	-
West Garafraxa	25,723	21,638	22,371
Eramosa	35,929	28,640	42,919
Erin	310,143	149,635	179,657
Guelph	410,830	241,688	337,445
Puslinch	1,701,671	1,816,021	2,068,861
Burlington	1,622,202	1,592,715	1,617,530
Milton	3,820,244	3,806,495	5,403,845
Halton Hills	1,705,394	1,927,413	1,982,376
East Luther	39,709	32,968	54,602
TOTALS	15,387,644	16,133,496	19,268,673

ground reserves on the order of 150 000 tons grading 0.16 ounce gold per ton at the Cordova Mines Property. An exploration agreement is presently under negotiation to develop additional reserves that may exist underground and from other locations in the adjoining areas.

RICE & McHARG QUARRIES LIMITED, GEORGETOWN

It has been a relatively good year with increased demand for natural Credit Valley building stone. While we have sold more material, we are in the process of licencing additional property for extraction and have run into quite a significant amount of red tape and had to limit our extraction. We hope to have an additional 10 acres licenced by 1986 and will hope to be able to provide our steady customers with their usual requirements for stone.

Our operation is mostly manual extraction, and modernization changes are very minimal at this point in time. We are, however, intending to start some rehabilitation procedures to improve the land value and quarry operations.

Overall, there are no significant changes, but demand for stone seems to have resurged and we hope to continue to provide this rather limited material to those interested.

GORMLEY SAND & GRAVEL LIMITED, GORMLEY

Our tonnage shipped during 1985 will be approximately the same as 1984. Our deposits in the Uxbridge area are generally going sandy, as are most of the other operators'.

We have recently purchased an underwater drag scraper to enable us to mine reserves that are currently below the water table, starting with our Tottenham pit located on the south side of Highway 9. After approximately four years, this equipment will be then moved to our pit located on the 7th concession of Whitchurch-Stouffville, to remove the underwater reserves at this location.

TABLE 14.3 . MAPS AND REPORTS PERTAINING TO THIS REGIONAL GEOLOGISTS AREA PUBLISHED DURING THIS YEAR BY THE ONTARIO GEOLOGICAL SURVEY , MINISTRY OF NORTHERN DEVELOPMENT AND MINES

Open File Reports	Preliminary Maps - Data Series			Aggregate Resources Publications				
OFR 5527	P. 2740	P. 2755	P. 2789	104	115	116	64	96
OFR 5537	P. 2741	P. 2756	P. 2801	102	103			
OFR 5549	P. 2742	P. 2763	P. 2809					
OFR 5555	P. 2743	P. 2772	P. 2819					
OFR 5565	P. 2752	P. 2776	P. 2822					

Mineral Resources Branch Publications		Miscellaneous Reports	
IMBP 6	VCS 4	MP 119	MP 122
		MP 127	

The quarry located in Carden Township continues to supply material for industrial and commercial growth in the northeast of Metro.

WALKER BROTHERS QUARRIES LIMITED, NIAGARA FALLS

Walker Brothers Quarries is a limestone surface mine located on the corner of Mountain Road and Thorold Townline Road in Niagara Falls.

We presently employ 18 personnel which are directly related to the production of crushed stone. As of the end of October, we have produced 460 000 tonnes. We plan to produce until December, which will give us a yearly production of approximately 540 000 tonnes. We operate three extraction faces ranging from 20 feet to 40 feet. We have made no major changes in our production system.

In 1986, we will probably experience identical market conditions in our area.

VINELAND QUARRIES & CRUSHED STONE LIMITED, VINELAND

Vineland Quarries is a limestone surface mine located on the corner of Fly Road and Regional Road 24 in Vineland.

We presently employ 11 personnel which are directly related to the production of crushed stone. As of the end of October, we have produced 440 000 tonnes. We plan to produce until December which will give us a yearly production of approximately 540 000 tonnes. We operate one extraction face ranging from 15 feet to 25 feet. We have made no major changes in our production system.

In 1986, we will probably experience identical market conditions in our area.

ARRISCRAFT CORPORATION, CAMBRIDGE

Under the name of Adair Marble Quarries, Arriscraft Corporation quarries a dolomitic limestone from the Amabel Formation for use as dimensional building stone.

Over the last few years there has been a very significant revival in the interest in dimension stone for major commercial buildings. We have supplied a number of major projects in the last year to a year and a half. These include:

1. The Ontario Courthouse. 70 000 square feet.
2. Numerous smaller commercial projects of approximately 20 000 square feet.
3. Currently specified for the supply of Adair stone on the new Canadian Chancery to be built in Washington, D.C. (180 000 square feet).

Actual production at the quarry in 1985 will exceed 20 000 metric tonnes. This is well in excess of any past year. We foresee this continuing indefinitely in the future.

In conjunction with the supply of marble for the Canadian Chancery in Washington, we anticipate building a major marble fabrication plant in Cambridge. This should proceed in early 1986. We believe that with these facilities in place we will be in a position to become one of the dominant natural stone suppliers on the continent.

FRANCESCHINI BROTHERS AGGREGATES LIMITED, MISSISSAUGA

We are pleased to report that 1985 sales will exceed our estimated forecasts by more than 20%, as recoveries in most sectors of the construction industry were prevalent.

Operations varied little from the past two years, other than the volume of shipments and capital expenditures were again restrained, other than the purchase of a new seven cubic yard loader for our Caledon operation.

It appears consumptions of aggregate within our shipping area will remain in line with 1985 levels.

UNITED AGGREGATES LIMITED, BRAMPTON

Armbro Aggregates has changed ownership and is now a Division of United Aggregates Limited. This took place September 1st, 1984, and includes the sand and gravel operations at Caledon and Brampton, Ontario; the limestone quarry operation at Ottawa, Ontario; and the Armbro Ready Mix operation in Mississauga, Ontario.

On June 15th, 1985 United Aggregates Limited purchased the Indusmin Quarry operation at Acton, Ontario, from Falconbridge Limited.

The Acton quarry had an extensive overhaul of plant and equipment and was re-opened September 1st. We are anticipating 2 million tons of production next year.

At Caledon our production should remain at about 2.5 million tons.

Our Ottawa quarry production should drop from 1.2 million tons in 1985 to about 800 000 tons in 1986.

ACRES INTERNATIONAL LIMITED, NIAGARA FALLS

Acres is a major international consulting engineering company that has provided quality engineering to its clients for over 60 years. Operations have spread throughout Canada and the United States, and to 60 countries in Central and South America, Africa, and Asia. Clients include major public utilities, large and small industrial concerns, all levels of government, and major foreign aid financial institutions such as the World Bank, the Asian Development Bank, the Canadian International Development Agency, and the United Nations Development Program.

Acres has been a leader in the unique development of Canada's vast resources and infrastructure which has employed capital, technology, and engineering skills from throughout the world. Acres' highly qualified staff employs worldwide state-of-the-art engineering technology. Its over 900 engineers, scientists, economists, technical specialists, and administrative staff are drawn from many countries and engineering traditions, and provide a synthesis of international major projects and industrial development experience.

Acres was contacted by the Ministry of Natural Resources to carry out a water resources inventory of Ontario. Extensive data was available on both the available water supplies of Ontario, as well as the uses of that water. This information was scattered in both public and internal government reports in different government departments and with various levels of accessibility.

Acres was commissioned to synthesize the available information into one document, utilizing map and graphical presentations as appropriate, so that the overall water quantity situation of the Province would be available to those with limited time.

The final document included 71 pages of text, graphs, and maps describing surface water resources, groundwater resources, and water uses in Ontario. Colour was used throughout to permit, through the use of colour changes and shading, complex data and interrelationships to be presented in a comprehensive and aesthetically pleasing map.

Information presented is based on data directly available, such as river flows and precipitation, as well as calculated information such as evapotranspiration. Water use information covers both consumptive and non-consumptive uses. The latter includes navigation and recreation.

The complete project including design, concept development, data collection and analyses, art work, and printing of 5000 copies was completed in 28 weeks.

DOMINION SOIL INVESTIGATION INCORPORATED, SCARBOROUGH

In the field of *geotechnical engineering* we have successfully undertaken subsurface explorations for a variety of residential and industrial buildings, ranging from investigations for individual houses to high rise buildings which are underlain by several basement levels. The variety of projects range from residential subdivisions to the proposed new Justice Centre in downtown Toronto, and industrial facilities such as the Chrysler Canada plant expansions in Windsor. This Company has undertaken investigations for sewer and watermain installation; for evaluation of the stability of both cut and natural slopes, and design of remedial measures for landslides; for design of highway and airport paving structures; for evaluation of granular reserves; terrain evaluations; and investigations for projects in permafrost areas. In undertaking the field explorations for this work, we have used *in situ* testing equipment, such as the static cone and flat dilatometer, to complement the conventional exploratory techniques.

This Company also undertakes *control testing* and approval of *construction materials and inspections.* We are approved by the Canada Standards Association (CSA) for concrete testing, and partake in the Ministry of Transportation and Communications' schemes for asphalt mix design and control, and chloride level in concrete. We undertake the supervision and control of placement of engineering fills, and site preparation. This Company also has on staff personnel who are qualified to carry out inspections of structural steel, built-up roofing, evaluations of the condition of concrete structures, and existing roof applications.

MacLAREN PLANSEARCH, TORONTO

The company provides services in Field Testing for hydrogeological and geological evaluations:

a) Drilling and sampling, installation of piezometers and other subsurface monitors in surficial sediments.

b) Drilling and drill stem tests to assess fracture flow hydrology in rock. Includes packer tests (falling head constant, head and pulse testing using electronic equipment), installation of deep piezometers, fracture logging for overall fracture patterns to assess flow directions.

c) Permeability testing, including pump testing, variations on slug tests.

d) Chemical sampling for standard parameters and trace organics.

e) Sampling for terrain analysis, aggregate inventories.

f) Geophysics: downhole and surface electromagnetic methods, downhole gamma, seismic, etc., for water supply studies and depth to bedrock location of contaminants plumes.

g) Geological mapping of surficial deposits and bedrock.

Field data are compiled and analyzed and comprehensive reports are written, often in conjunction with other disciplines. Data analysis is supported by computer modelling. These vary from use of large computer models on our mainframe to small models run on the microcomputers. Extensive data analysis is required for pump test and slug test results. Often analytical solutions are employed as a predictive device. Remote sensing techniques are used as support for the field work.

In addition, MacLaren has a fully equipped laboratory which has the capacity for soils analysis and a full range of chemical analysis, including trace organics.

In-house expertise includes biology, air environment, nuclear studies, waste treatment, process design, systems division, and waste management.

As part of Lavalin, we have immediate access to geotechnical expertise.

Major projects with earth science involvement in 1985 include:

a) The Region of Peel Solid Water Management Study is concerned with finding a new sanitary landfill site in northwest Brampton. The earth science involvement included extensive drilling to confirm bedrock and install piezometers in seven areas across the Region; terrain analysis for sediment types; permeability testing and water level monitoring for an assessment of groundwater flow conditions; and assessment of the optimum site based on geological parameters.

b) Tanenbaum Brothers Investments Limited The 801 Lakeshore Boulevard site was once a Domtar coal tar plant and over the years extensive coal-tar-related substances such as polynuclear aromatic hydrocarbons, anthraquinone, and phthalic anhydride had been disposed of on the site. The hydrogeological aspects of the study carried out by MacLaren involved characterizing the site hydrogeology and patterns of contamination. The proposed remedial works were designed by Cutforth White & Associates in conjunction with MacLaren, and involved the capture of groundwater flowing off the site using the proposed new building's tile drain system. This unique solution necessitated obtaining the Minister of the Environment's approval under Section 45 of the Environmental Assessment Act.

c) Canadian General Electric—Davenport Site Remedial works to contain and recover PCB-contaminated oils and other organic chemicals floating on groundwater were designed and constructed. The contaminated oils were recovered using large diameter wells with two pump systems, one for lowering the water table and the other for collecting oil. The wells were pump tested and the data used as input to a simple computer model for the prediction of further well spacings.

C. MIRZA ENGINEERING INCORPORATED AND STRATA ENGINEERING CORPORATION, DON MILLS

Two important projects were completed during 1985.

The first was a study of the geological "Type" exposure on the north slope of the Don Valley Brickyards. This study was commissioned by the Ontario Heritage League under the auspices of the Ministry of Citizenship and Culture. It involved mapping of the exposed face, sampling the various exposed strata (often precariously for our geologists), and limited testing. The purpose of the project was to identify the minimum slope requirements for stability and erosion control, as well as to provide a conceptual plan for the preservation of the exposure for future geological and educational purposes.

The report addresses the geological features of particular interest to the scientific community. It includes an analysis of slopes cut back to various angles, and includes a summary of the history of slope failures along the Don Valley.

The second project was a study of alternate sources for sand and gravel to meet the demands for these materials in the Regional Municipality of Niagara to the Year 2010 and beyond. Partners in this study were Martini and Associates of Guelph and Peat Marwick of Toronto. The Planning Department of Niagara Region carried out a review of land based resources, while Martini and Associates examined the potential for dredged sand from the Niagara Bar. Peat Marwick and Partners carried out economic analyses of transportation modes for trucking or shipping imported materials into the Region.

The fundamental basis of the study, as given by the Region, was to assume that the Fonthill Kame, which now supplies a major portion of the aggregates for concrete, roads, winter sanding, and other uses, would no longer be available. Demand forecasting involved examination of statistics for population growth, propensity to form households, construction activity levels, and other vital data. Emerging conservation technologies were also examined for their impact on aggregate consumption; technologies such as recycling, materials modification, and the use of other materials such as slag, foundry sand, etc.

The study concluded that there would be a concrete sand deficiency, which could be made up if the technology relevant to manufactured sand could be developed to a reliable state. The study also recommends further areas for research before any irrevocable decisions are made with respect to the future disposition of the Fonthill Kame.

Ongoing work during 1985 included continued research on Aquifer Thermal Energy Storage at the Scarborough "Canada Centre" site, where instrumentation is now complete and commissioning is well underway. The firm also investigated the potential for Micro-Hydro electric power applications at sites in Orangeville. Research is also underway on coupled heat-moisture flow, modelling of mine crown pillars, and landslide stabilization.

We wish to acknowledge the support and encouragement of many individuals in government and the private sector who were instrumental in helping us undertake these studies and bring them to fruition.

STAKING AND EXPLORATION

Exploration and development activities in the Central Region increased in 1984. Most of these activities included diamond drilling, airborne geophysics, development drifts, and miscellaneous. Total exploration and development expenditure for 1984 was $339 804, up 14% from 1983.

In 1985, eleven new mining claims were recorded and eighteen claims cancelled, bringing the current total to fourteen mining claims. All of these claims are in Belmont Township, Peterborough County. There are also twelve mining leases in Belmont Township. Over 200 man-days of assessment work has been filed on the unpatented mining claims in 1985.

REGIONAL GEOLOGICAL EVALUATION PROJECTS

SANDSTONE RESOURCES STUDY

Both stages of this study have now been completed and the final publication for Stages I and II were released as Open File Reports 5363 and 5549 respectively.

SHALE AND CLAY RESOURCES STUDY

This study was initiated in late 1984 to assess the suitability of this Region's selected clay and shale resources for their ceramic properties for wall, floor, and roofing tile manufacture. This year the study area was expanded to include the clays and shales of Southwestern Region as well. All tests have now been completed for this second stage, and the first draft of the report is under review. The final report for the second stage should be available in 1986 as an Open File Report. Open File Report 5571 on the 1984 study has now been released.

TOWNSHIP AGGREGATE INVENTORIES

To date, a total of 65 aggregate inventories have been completed and published for this Region. Publications for the towns of Lincoln, West Lincoln, Grimsby, and Haldimand; townships of Wainfleet, Woolwich, Cavan, North Monaghan, and South Monaghan; and the cities of Guelph, Kitchener, Waterloo, and Cambridge were released in 1985.

PROJECTS UNDER THE MINING SECTOR WORK PROGRAM AND ONTARIO YOUTH OPPORTUNITY PROGRAM

Lindsay, Niagara, Maple, and Cambridge Districts have completed a number of projects under this program. These projects were designed to collect additional mineral resource and statistical data for planning and resource management.

Maple and Lindsay Districts are examining planning constraints to determine their impact on mineral aggregate resources in the Durham Region. Maple is conducting a similar project for the Region of York.

Cambridge District has completed a Floodplain Aggregate Study, carried out by Planning Initiatives and Frances Nicholas Limited of Kitchener, Ontario.

Maple, Lindsay, and Niagara Districts have completed a commodities survey of their areas.

Niagara District has completed studies on land use trends over the past thirty years on the Fonthill Kame area; Paleozoic and Quaternary geology of Shorthills Provincial Park; and detailed drift thickness maps of the entire District at 1:10 000.

RE–EVALUATION OF POTENTIALLY AVAILABLE AGGREGATE RESOURCES IN THE REGION

A cooperative effort between Region and Districts on this project has been started in 1985. Due to lack of funding, this project will be spread over several years and will be completed in-house.

PUBLIC AWARENESS PROGRAMS

Regional office staff, along with Ontario Geological Survey, presented an exhibit on natural building stone at the Woodfire '85 Show in Malton in May, and again at the Toronto Home and Do-It-Yourself Show in October.

Niagara District staff led several tours of the Queenston Quarry Property of Steetley Industries to provide assistance to the operators in the development of a new comprehensive rehabilitation plan for the property. Tours were given for Ministry staff, the Ontario Heritage Foundation, and a Canadian Broadcasting Corporation (CBC) film crew for the program "The Nature of Things". Lindsay District staff gave a presentation on the District's Mineral Resources program to the Junior Rangers at Coldsprings Camp, followed by a field trip to TRT Industries Limited in Manvers Township. Maple District staff conducted geological tours for Junior Forest Rangers and the Township of Uxbridge municipal staff.

Regional and Maple District staff conducted a tour for visitors from Malayasia who were in Canada to study modern quarrying techniques and building stone products.

SUMMARY OF FIELD WORK BY THE ONTARIO GEOLOGICAL SURVEY

I. Peter Martini and James P. Kwong of Martini and Associates of Guelph, Ontario, conducted a sedimentological examination and geological mapping to identify depositional environments of selected clay and shale resources. Samples of these resources were subjected to ceramic testing at CANMET Labs at Ottawa for their suitability for manufacture of ceramic products.

P.F. Karrow of the University of Waterloo continued mapping of Quarternary geology of the Brampton Sheet.

GEOSCIENCE RESEARCH GRANT PROGRAM

R.N. Farvolden, J.P. Greenhouse, and P.F. Karrow of the University of Waterloo continued their work under Grant 128 on Subsurface Quarternary Stratigraphy Using Borehole Geophysics. The project began in 1982. The study has as its dual objectives obtaining information on the Quarternary stratigraphy of the Kitchener-Waterloo region, and improving techniques of recording and interpreting geophysical logs for this purpose.

M.C. Miles, E.C. Appleyard, K. O'Shea, P. Lapcevic, S.K. Frape, and P. Fritz of the University of Waterloo continued their work under Grant 148 on Geochemical Study of the Salina Group of Southern Ontario—Isotopes, and Major and Minor Elements.

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15. Southwestern Regional Geologist Area, Southwestern Region

R.A. Trevail[1,2], B.H. Feenstra[3], P. Pakvis[4], and J. Sando[4]

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INTRODUCTION

Southwestern Region is unique in the Province as the conventional mineral resources program is combined with the petroleum resources program to provide a multi-faceted approach to encouraging exploration for and development of mineral resources within the Region and hydrocarbons within the Province. The three main aspects of the program include geological, engineering, and enforcement functions. All geological aspects of the program are carried out from the Petroleum Resources Laboratory while the engineering and enforcement functions and program administration originate from the Regional office.

The Petroleum Resources Laboratory, located at 458 Central Avenue, London, doubles as the Regional Geologist's office. Staff include R.A. Trevail, fulfilling the dual role of Chief Geologist of the Lab and Regional Geologist; B.H. Feenstra, Mineral Resources Geologist, and M. Campbell, Petroleum Resources Lab Technician. Contract staff employed at year end were: C. Palmer, M. Bernardo, D. Perkin, P. Pakvis, and J. Sando. Other contract staff employed during the year included C.L. Trussler, J.A. Barnicke, M.T. vanDeursen, D.K. Parker, and L. Walkom.

The Regional office, located at 659 Exeter Road, London, is staffed by P.A. Palonen, Provincial Petroleum Supervisor-Regional Mineral Resources Coordinator; R. Rybansky, Reservoir Engineer; H.E. Habib, Reservoir Engineer; K. Kinnear, Geotechnical Engineering Assistant; P.A. Wright, Administrative Assistant, Petroleum Resources; I. Cameron, Drafter, C. Hesselmans, Acting Systems Analyst; F.E. Kamps, Acting Data Processing Technician; and M.T. vanDeursen, Program Secretary. Contract staff include C.M. Rose and B. Davidson.

Mineral Resources Supervisors, T.R. Carter in Wingham and J.W.E. Lau in Aylmer, provide geological expertise to the districts. Petroleum Resources Inspectors, responsible for enforcement of the Petroleum Resources Act, are located at the District Offices in Aylmer, Chatham, and Simcoe. Pits and Quarries Inspectors, responsible for enforcement of the Pits and Quarries Control Act, are located at the District Offices in Aylmer, Chatham, Owen Sound, Simcoe, and Wingham.

REGIONAL GEOLOGIST OFFICE ACTIVITIES

On an average, 600 to 700 people per year utilize the Petroleum Resources Laboratory facilities personally to gather information, both geological and regulatory, examine drill cuttings and core, and discuss ongoing or potential exploration and development programs (both mineral and hydrocarbon) with professional staff. To meet the continually growing demand for information and technical expertise, staff have initiated a number of programs designed to increase base knowledge of specific mineral deposits occurring within the Region and the potential markets for those deposits.

The first part of this report summarizes Petroleum Resources activities and the second part summarizes Industrial Mineral Resources activities in the Region.

PETROLEUM RESOURCES ACTIVITIES

The Petroleum Resources Laboratory is a repository for all subsurface geological samples consisting of drill cuttings and cores obtained from the drilling of wells penetrating geological formations of Cambrian or more recent age, and, more generally, those drilled as part of petroleum exploration and development programs. Following expiry of the confidentiality period as provided for by regulation under the Petroleum Resources Act, all samples, cores, geophysical well logs, and related information submitted to the Section are placed in the public domain.

Hydrocarbon Energy Resources Program

Work continued in 1985 on the 40-month long study of Ontario's conventional oil and gas reserves and potential, an integral part of the Hydrocarbon Energy Resources Program (HERP) funded by the Ontario Ministry of Treasury and Economics under the Board of Industrial Leadership and Development (BILD). A report titled "Evaluation of the Conventional and Potential Oil and Gas Reserves of the Devonian of Ontario" (Bailey and Cochrane 1985) was released in September by the Ontario Geological Survey as Open File Report 5555, along with 86 Preliminary Maps at a scale of 1:100 000 showing the regional structure and/or isopach contours of the following horizons:

1. Structure Top of Pre-Hamilton Devonian Carbonates
2. Isopach Gross Columbus Sandstone Section
3. Structure Base Columbus Sandstone
4. Isopach Oriskany-Springvale Sandstone
5. Isopach Sylvania Sandstone
6. Structure Top Devonian Sulphur Water-Porosity
7. Isopach Top Devonian Carbonate to Top Sulphur Water-Porosity

In addition to these, detailed oil and gas pool maps at a scale of 1:20 000 were prepared for the following pools:

1. Bothwell-Thamesville
2. Florence-Oakdale

3. Glencoe
4. Oil Springs
5. Petrolia
6. Plympton-Sarnia
7. Rodney
8. Romney
9. Wallacetown
10. Watford-Kerwood
11. Wilsoncroft

Both the Silurian Sandstone and Silurian Reef Complex reports are in the final stages of preparation for publication and should be ready for release in the first half of 1986. Work continued on the final report, a summary of the findings of the project including a calculation of the current known reserves and a projection of the potential resources.

Copies of those Open File Reports released to date may be obtained for the cost of reproduction from:

Astley-Gilbert Reproductions Limited
23 Metropolitan Road
Scarborough, Ontario
M1R 2T5
Telephone: (416) 291-9595

Computer Innovations

Computerization within the Petroleum Resources Section moved ahead dramatically with completion and installation of the Ontario Petroleum Data System (OPDS). Developed by DataPlotting Services Incorporated (DSI) of Toronto, OPDS consists of a powerful suite of applications programs integrated with a database management system on a DEC VAX computer located at DSI's office in Toronto. The System can be accessed directly at this central site or from IBM PC's at local sites. The IBM PC's are also used for local data entry and verification and other local applications.

OPDS is capable of producing reports, statistics, graphs and charts, well location maps, contour maps, and perspective views of geological structures utilizing information stored in the system for approximately 13 000 wells.

In June of 1985, approval was granted by Management Board of Cabinet for Southwestern Region to acquire a DEC VAX 11/750 computer and associated hardware and software. The Petroleum Resources Section is the current primary user and is in the process of enhancing the OPDS to meet the requirements of the Section as a whole. The updated system, to be known as the Petroleum Resources Data System (PRDS), will incorporate programs to facilitate the regulatory processes of well permitting, bonding, licencing, and Lake Erie expenditures and credits as well as a petroleum engineering software package to allow a rapid yet sophisticated method of hydrocarbon reservoir analysis. The Section will use the system to design programs which both promote the search for, and regulate the production of, hydrocarbons in Ontario.

Ontario Energy Board

One important aspect of the Petroleum Resources program is to provide technical assistance to the Ministry of Energy and the Ontario Energy Board (hereafter referred to as "the Board") on specific energy-related matters, particularly those dealing with exploration, development, and production of oil and gas pools. Such technical assistance ranges from verbal consultation on matters of procedure through to preparation of technical reports and presentation of findings contained therein at formal Board hearings.

During 1985, Petroleum Resources personnel participated in one formal hearing (E.B.O. 111), provided technical advice to the Board counsel at a second formal hearing (E.B.O. 114), and participated in an informal hearing (E.B.R.M. 80) arising from a matter referred to the Board by the Minister of Natural Resources under Section 11 of the Petroleum Resources Act.

E.B.O. 111 dealt with an application by G.W. Clarke Oil and Gas Company for an Order requiring and regulating the joining of interests, generally referred to as unitization, within the Enniskillen #26 Pool located in Enniskillen Township, Lambton County, for the purpose of gas production, the designation of management, and the determination of the lessees with a working interest in the pool as well as apportioning the costs and benefits of operating the pool. After the filing of the Applicant's prefiled evidence in October 1984, the Petroleum Resources Section was asked by Board staff to examine the Applicant's evidence and to provide expert testimony at the hearing. The main point of contention concerned the location of the pool boundaries which in turn delimits the boundaries of the participating and non-participating areas with respect to both working interest (lessee) and royalty interest (lessor) parties. At stake was the Applicant's estimate of 10.2 to 14.2 10^6m^3 of gas worth about $1.4 to $1.7 million.

The hearing was held in Sarnia, Ontario, from March 5 to March 8, 1985. Six witnesses testified on behalf of the Applicant; R.A. Trevail and P.A. Palonen of the Petroleum Resources Section testified on behalf of Board staff; and two additional witnesses were called by various intervenors. Four landowners made oral submissions on their own behalf.

The issues addressed by the Board in its Reasons for Decision included the boundary of the participating area, boundary of the unit area, parties to the unitization, landowner compensation, and gas company compensation. The Board adopted the boundaries of the participating area based on the zero contour of the net pay isopach as interpreted by R.A. Trevail from available geological evidence. Board members also accepted the location of unit area boundaries as proposed by Ontario Ministry of Natural Resources staff as well as the determination of division of royalties among landowners and the working interest of the companies involved

As for landowner compensation, the Board set royalty payments for gas at 6.25%, the value proposed by the Applicant, to be shared on acreage basis. Payment to landowners for acres lying outside the participating area but within the unit area was set at $15.00 per acre per year. Land contiguous to the unit area was eligible for payment of $10.00 per acre per year.

The Board determined that Union Gas Limited was not eligible for compensation under the Joint Operating Agreement as Union Gas Limited had produced gas from the pool for a number of years without compensation to the other parties. However, the Board did order that costs accrued by G.W. Clarke Oil and Gas Company be repaid under the Joint Operating Agreement after royalty payments are determined and paid, but before working interest payments.

At the formal hearing for E.B.O. 114, technical advice was provided to Board counsel by P.A. Palonen and H.E. Habib. Once again, the Board was concerned with an application for an Order requiring and regulating the joining of interests, this time within the Cromar Pool located in Moore Township, Lambton County.

The applicant, Ram Petroleums Limited of Toronto, contended that the Cromar Pool, consisting of one producing gas well, one shut-in gas well, and two oil wells was a single, relatively large reservoir of oil underlying a substantial volume of gas.

The intervenors, Forbes Resources Incorporated, H. Brett Associates Limited (together referred to as Forbes/Brett), and B. Corden, however, strongly opposed Ram Petroleums Limited's interpretation testifying that in fact there were two separate and distinct hydrocarbon pools, one gas and one oil.

Following a rather lengthy hearing, April 29 to May 1 in Sarnia, and May 14 to May 17 in Toronto, the Board spent three months reviewing evidence presented and written argument received from the parties involved. In September, the Board released its Reasons for Decision finding in favour of the two-pool concept and ordering unitization of the pool containing the two gas wells (Cromar East). The parties were given 30 days to reach an agreement with respect to the pool boundaries. If agreement was not reached within the allotted time period, the Board recommended that the producing gas well be shut in until such time as agreement is reached or the Board settles the issue by Order. Agreement was not reached within the alloted 30 days and the well was subsequently shut on October 16, 1985. At the time of writing, the well remains shut in. In addition, Forbes/Brett was designated operator of the pool based on 15 years experience in the area.

Persuant to Section 11 of the Petroleum Resources Act, the Minister of Natural Resources refers to the Board for a report any application to inject fluids into a geological formation where the point of injection lies within 1.6 km of the boundary a designated natural gas storage area. The Board in turn holds a hearing, then reports its findings to the Minister. E.B.R.M. 80 concerned an application made by Proto Resources and Associates to inject fluid into the Silurian Guelph Formation by way of a procedure known as acid fracturing utilizing 9.09 m^3 of 28% HCl. The objective of acid fracturing is to increase the natural porosity and permeability of the formation in the vicinity of the wellbore, thereby increasing the drainage surface area open to the wellbore. This procedure generally results in increased rates of production and is considered to be proper oil field practice.

Natural gas storage reservoirs are a very valuable asset to the Province and it is important that their integrity remain intact. Therefore, any procedure undertaken within the 1.6 km buffer zone, such as acid injection, which may potentially cause irreparable damage to the gas storage reservoir, should have certain limiting operating conditions placed on it so that such damage does not occur. P.A. Palonen and R.A. Trevail supported this viewpoint at the hearing held in Toronto, November 14, 1985.

In its report to the Minister, the Board recommended that a permit to inject HCl acid into the Guelph Formation be subject to the following conditions:

1. Maximum bottom hole pressure: 11 030 kPa
2. Maximum injection rate: 0.79 m^3/minute
3. Maximum volume injected: 9.09 m^3
4. The complete procedure to be witnessed by a representative of the Petroleum Resources Section and Union Gas Limited.

The Board also expressed concern as to whether the 1.6 km buffer zone is realistic or not. It recommended the Petroleum Resources Section undertake an appropriate study to determine whether data exists or can be developed, either by reference to actual experience or by simulation, to support the assumption that a 1.6 km buffer zone provides adequate protection from damage by the procedure of formation fracturing.

Geoscience Information

"Oil and Gas Developments in Eastern Canada in 1984" (Trevail and Parker 1985) was compiled and written for the American Association of Petroleum Geologists. This annual report summarizes activities and highlights of exploration and production trends in Ontario and Eastern Canada for 1984. Reprints are available at the Petroleum Resources Laboratory.

R.A. Trevail presented one technical paper and co-authored three other papers presented in 1985. "Tectonic and Diagenetic Controls on the Development of Middle Ordovician Carbonate Hydrocarbon Reservoirs, Essex County, Ontario" (Trevail, in press) was presented at the 24th Annual Conference of the Ontario Petroleum Institute held in London, Ontario. Recent oil discoveries in the Middle Ordovician Trenton and Black River Groups have stimulated exploration for deep targets in the region and identified a need to understand more fully the tectonic and diagenetic controls on the genesis of these fracture related reservoirs.

Essex County was chosen as the area of investigation as 7 of the 20 known Ordovician pools are located within its boundaries. Detailed study of the regional geology and reservoirs themselves utilizing XRD, SEM, XRF, and microprobe analyses confirmed the previously held view that fracturing, dolomitization, and hydrocarbon entrapment are intimately associated.

Reservoir porosity is generally confined to dolomitized bioclastic zones of the Verulam and Kirkfield Formations and dolomitized burrows of the Gull River Formation with minor development in the fracture zone. Porosity types include intercrystalline, interparticle, intraparticle, vug, channel, and fracture.

Minor occurrences of sphalerite, barite, and sulphide mineralization containing copper and nickel are associated with the dolomitized fracture zones and reservoirs. Such minerals are typically associated with Mississippi Valley Type (MVT) lead-zinc deposits.

Besides mineralization, other features the reservoirs have in common with MVT deposits include dolomitization of host rock, development of baroque (sparry) dolomite, linear fracture zones, and evidence of subaerial exposure (karstification).

It is proposed that during lithification, structural deformation related to rejuvenation of a Precambrian fracture framework, triggered by orogenic events in the nearby Appalachian Orogen, created vertical fractures in the carbonate rock. Such fractures served as conduits for diagenetic fluids which dolomitized the host rock, created porosity, and deposited minerals typical of MVT deposits. Oil derived from the Collingwood Member of the Cobourg (Lindsay) Formation migrated into the host reservoirs sometime following the Mississippian.

Also presented at the 1985 Ontario Petroleum Institute Conference were "The Use of Remote Sensing Technology in the Search for Oil and Gas in Southern Ontario" (Singhroy and Trevail, in press) and "Computer Innovations in the Petroleum Resources Section—OPDS" (Hesselmans and Trevail, in press). The former dealt with identifying lineaments utilizing enhanced LANDSAT MSS and thematic mapper (TM) images as well as airborne colour infrared and thermal infrared data. Also discussed were difficulties in differentiating structural lineaments from other types of lineaments in an area of thick glacial drift and intense agricultural activity. The latter paper, presented by C. Hesselmans, Acting Systems Analyst, described the design, implementation, and capabilities of the Ontario Petroleum Data System (OPDS). OPDS is a computerized system for acquisition, storage, retrieval, and processing of oil and gas well data installed on a DEC VAX 11/780 computer accessible by a IBM PC-XT and/or remote terminal such as the DEC VT220.

In October, M.T. Holroyd, Vice-President, Research and Development, DataPlotting Services, Incorporated presented "OPDS: The Ontario Petroleum Data System" (Holroyd and Trevail 1985) at the 55th Annual International Meeting and Exposition of the Society of Exploration Geophysicists held in Washington, D.C. Topics discussed included hierarchal database structure, data input and verification, transfer files, and central site operations on a VAX 11/780 including main database maintenance (backups, error recovery, etc.), large volume data loading and retrieval, large scale applications processes, and high precision, high quality graphics output.

Statistics and Highlights

As the 1984 Report of Activities (Feenstra *et al.* 1985) contained statistics up to and including November 30, 1984, the authors feel the reader would be well served if the final 1984 results were presented herein. The 200 wells drilled in 1984 were divided among 71 exploratory, 101 development, and 28 service wells. The drilling success rate was 50% with 54 wells completed as gas producers (11 exploratory, 43 development) and 26 wells completed as oil producers (9 exploratory, 17 development). A total of 97 158 m of section was drilled. Both oil and gas production increased in 1984 with total production of 90 376 m^3 of oil and 548 166 x 10^3m^3 of natural gas. Further details are available in Trevail and Parker (1985).

Drilling and production statistics are available for the period up to and including November 30, 1985. Table 15.1 provides a summary of wells drilled, listed by county and township. Petroleum activity highlights are shown in Figure 15.1.

Statistics indicate land based drilling is down 7% from 1984, divided among 47 exploratory, 34 development, and 22 service wells drilled. A total of 58 862.6 m was drilled. The success rate for exploratory drilling was 23% with 3 oil producers, 8 gas producers, and 33 dry holes drilled. Three exploratory wells were listed as suspended. Development drilling was 77% successful resulting in 22 oil producers, 4 gas producers, and 8 dry holes.

A total of 71 wells were drilled offshore in Lake Erie in 1985. Forty-two were completed as gas producers for an overall drilling success rate of 59%. A total of 37 790.8 m was drilled offshore.

Oil production to the end of November was 103 184.7 m^3. Projected estimates of 1985 oil production exceed 112 000 m^3, a 24% increase over 1984. The increase in production is attributed to the Mersea 1-15-B and Dover 7-5-V oil pools coming on full production during the latter half of the year. Natural gas production in 1985 is estimated at 535 000 10^3m^3, a slight decrease from 1984.

The Consumers' Gas Company Limited, in conjunction with partners Onexco Oil and Gas Limited, and Pembina Resources Limited continued development of the Mersea 1-15-B pool. At the present time, ten wells are on production and two other oil producers are awaiting hook up. The Dover 7-5-V pool, operated by E.P. Rowe Oil Limited and Ram Petroleums Limited, currently has four producing oil wells, two suspended oil wells, one shut in gas well, and one well awaiting completion. Both of these pools produce hydrocarbons from the Middle Ordovician Trenton and Black River Groups. Together, the two pools now account for 44% of Ontario's daily oil production of 360 m^3 per day. The percentage is expected to increase once the shut in and suspended wells are put on production.

Devran Petroleum Limited of London, Ontario, began developing and implementing a mine-assisted gravity drainage of petroleum project in the abandoned Sarnia-London Road Pool in Sarnia Township, Lambton County, to recover a large percentage of the estimated 2.1 10^6m^3 of oil remaining in place. Shell

TABLE 15.1 SUMMARY OF WELLS DRILLED IN 1985. (until November 30, 1985)

		Exploratory						Development						Service		Total	
County	Township	Gas	Oil	Dry	Susp	No.of Wells	Metres Drilled	Gas	Oil	Dry	Susp	No.of Wells	Metres Drilled	No.of Wells	Metres Drilled	No.of Wells	Metres Drilled
Cochrane	Morrow					0						0		1	321.0	1	321.0
Elgin	Aldborough			3	1	4	549.2		4	1		5	597.2			9	1146.4
	Southwold			1		1	1119.0					0				1	1119.0
Essex	Anderdon											0		2	760.8	2	760.8
	Mersea		1	1		2	2159.0		7			7	6795.0	1	170.0	10	9124.0
Grey	Keppel			1		1	451.4					0				1	451.4
Huron	Stephen			1		1	551.7					0				1	551.7
Kent	Camden Gore			1		1	1228.5					0				1	1228.5
	Chatham			1		1	518.2		1	1		2	1059.0			3	1577.2
	Dover			2		2	2379.8		2	1		3	3458.0			5	5837.8
	Howard			1		1	122.0					0				1	122.0
	Raleigh			1		1	1154.0		2			2	588.7			3	1742.7
	Zone			1		1	548.0			2		2	249.5			3	797.5
	Tilbury E			1		1	1155					0				1	1155.0
Lambton	Brooke			3		3	1888.2					0				3	1888.2
	Dawn		1	1		2	1164.6		2	1		3	1820.0	4	2338.7	9	5323.3
	Enniskillen		1	4		5	3271.0		3			3	429.4	1	237.1	9	3937.5
	Moore			2	1	3	2823.0					0		10	6332.8	13	9155.8
	Sarnia					0						0		1	816.0	1	816.0
	Sombra			2	1	3	2447.0		1			1	535.0			4	2982.0
	Warwick			1		1	681.0					0				1	681.0
Manitoulin	Cockburn I.													1	521.0	1	521.0
Middlesex	Ekfrid			2		2	1243.2					0				2	1243.2
	McGillivray			1		1	580.0					0				1	580.0
	Mosa			2		2	280.0					0				2	280.0
	W.Williams													1	36.6	1	36.6
Norfolk	Charlotteville	2				2	806.0	1				1	397.8			3	1203.8
	Houghton	1				1	420.3	1		1		2	837.7			3	1258.0
	Middleton					0		2		1		3	1103.4			3	1103.4
	S.Walsingham	2				2	885.3					0				2	885.3
	Woodhouse	3				3	1032.5					0				3	1032.5
Lake Erie		2		3		5	2734.0	8		5		13	6106.3			18	8840.3
Total		10	3	36	3	52	32191.9	12	22	13	0	67	23977.0	22	11534.0	121	67702.9

Canada Resources Limited is sharing the costs of the $6.3 million project on a roughly 50/50 basis. Plans called for sinking a vertical mine shaft into the oil-bearing horizon at 120 m and, from two work stations excavated at the bottom of the shaft, drill horizontal holes into the pay zone. A radial pattern of 24 drill-holes (one every 15°), 760 m in length is expected to drain an area of approximately 160 ha. Over 18 000 horizontal metres of open hole will be drilled in each pay zone resulting in over 40 times the amount of reservoir exposure normally available in conventional vertical well recovery techniques.

The initial phase of shaft excavation was completed in March with 2.7 m casing set into bedrock at 33 m and cemented in place. Site work and erection of surface facilities were carried out through the Summer. In early September, Patrick Harrison of North Bay, the mining contractor, arrived at the site.

The second stage of excavation, through approximately 85 to 90 m of Devonian shales and carbonates, commenced in late November with completion targeted for mid-January. Construction of production stations is scheduled to be finished one month later. Devran Petroleum Limited officials expect horizontal drilling to begin in early March. Anticipated initial production rates range from 16 to 80 m^3 per day. A large number of companies from outside the Province, both Canadian and American, have expressed interest in conducting hydrocarbon exploration programs in Ontario, a reversal in the trend of exploration capital leaving the Province following introduction of the National Energy Program (NEP) in 1980. Shallow drilling depths, relatively low drilling and completion costs, local markets, and recent successes are attractive incentives to out-of-Province investors.

MINERAL RESOURCES ACTIVITIES

The primary objective of the mineral resources program in Southwestern Region is to stimulate exploration and development of industrial mineral resources in the region. The program provides information and professional advice regarding local and regional geology, mineral deposits, exploration, mining, mineral processing, uses, and markets.

Current extraction from Paleozoic limestone, dolostone, and shale, and Quaternary sand, gravel, and clay deposits at pits and quarries is for construction aggregate, lime for iron, steel, and soda ash, grey and white cement, porous clay drain pipe, and building stone markets. Total production is expected to show a modest increase over the 1984 level of 22

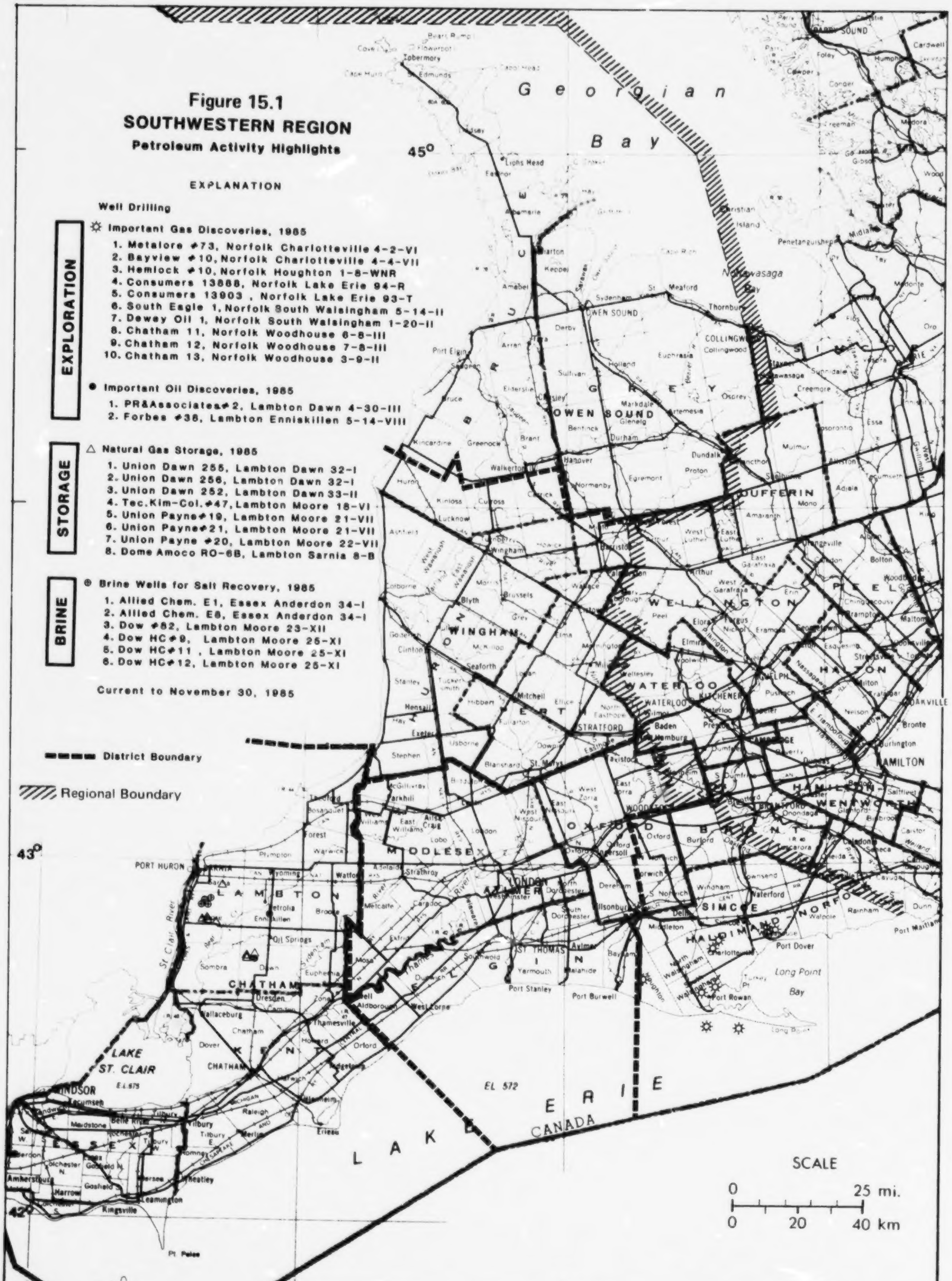

Figure 15.1
SOUTHWESTERN REGION
Petroleum Activity Highlights

EXPLANATION

Well Drilling

EXPLORATION

☼ Important Gas Discoveries, 1985

1. Metalore #73, Norfolk Charlotteville 4-2-VI
2. Bayview #10, Norfolk Charlotteville 4-4-VII
3. Hemlock #10, Norfolk Houghton 1-8-WNR
4. Consumers 13888, Norfolk Lake Erie 94-R
5. Consumers 13903, Norfolk Lake Erie 93-T
6. South Eagle 1, Norfolk South Walsingham 5-14-II
7. Dewey Oil 1, Norfolk South Walsingham 1-20-II
8. Chatham 11, Norfolk Woodhouse 6-8-III
9. Chatham 12, Norfolk Woodhouse 7-8-III
10. Chatham 13, Norfolk Woodhouse 3-9-II

● Important Oil Discoveries, 1985

1. PR&Associates#2, Lambton Dawn 4-30-III
2. Forbes #38, Lambton Enniskillen 5-14-VIII

STORAGE

△ Natural Gas Storage, 1985

1. Union Dawn 255, Lambton Dawn 32-I
2. Union Dawn 256, Lambton Dawn 32-I
3. Union Dawn 252, Lambton Dawn 33-II
4. Tec.Kim-Col.#47, Lambton Moore 18-VI
5. Union Payne#19, Lambton Moore 21-VII
6. Union Payne#21, Lambton Moore 21-VII
7. Union Payne #20, Lambton Moore 22-VII
8. Dome Amoco RO-6B, Lambton Sarnia 8-B

BRINE

⊕ Brine Wells for Salt Recovery, 1985

1. Allied Chem. E1, Essex Anderdon 34-I
2. Allied Chem. E8, Essex Anderdon 34-I
3. Dow #82, Lambton Moore 23-XII
4. Dow HC#9, Lambton Moore 25-XI
5. Dow HC#11, Lambton Moore 25-XI
6. Dow HC#12, Lambton Moore 25-XI

Current to November 30, 1985

▬ ▬ District Boundary

▨ Regional Boundary

Georgian Bay
45°
43°
42°
83°
82°
81°
80°
Tobermory
Owen Sound
Collingwood
Nottawasaga Bay
Christian Island
Penetanguishene
Midland
Grey
Dufferin
Peel
Wellington
Waterloo
Kitchener
Guelph
Halton
Oakville
Hamilton
Hamilton Wentworth
Brant
Brantford
Oxford
Woodstock
Stratford
Perth
Huron
Wingham
Kincardine
Walkerton
Hanover
Middlesex
London
Lambton
Sarnia
Port Huron
St. Clair River
Petrolia
Oil Springs
Chatham
Kent
Lake St. Clair
Windsor
Essex
Leamington
Kingsville
Amherstburg
Pt Pelee
Pelee Island
Middle I
Elgin
St Thomas
Aylmer
Port Stanley
Port Burwell
Simcoe
Haldimand-Norfolk
Port Dover
Port Rowan
Long Point Bay
Lake Erie
EL 572
Canada
Dunnville
Port Maitland
SCALE
0
25 mi.
0
20
40 km

TABLE 15.2 AGGREGATE PRODUCTION FROM LICENCED PITS AND QUARRIES DURING THE YEAR, 1984.

District	Number of Designated Townships	Number of Licensed Pits and Quarries★	Sand and Gravel (Tonnes)	Stone (Tonnes)	Clay and Shale (Tonnes)	Total (Tonnes)
Aylmer	29 (all)	141 (68% of total)	5,951,486	2,515,391	119,365	8,586,242
Chatham	35 (all)	69 (55% of total)	1,714,742	1,655,475	11,561	3,381,777
Owen Sound	28 (all)	154 (76% of total)	2,507,647	259,730	7,989	2,775,366
Simcoe	15 (all)	20 (60% of total)	499,779	136,882	2,174	638,835
Wingham	32 (all)	178 (63% of total)	3,319,264	302,322	132,932	3,754,518
TOTAL	139	562	13,992,918	4,869,800	274,021	19,136,739

★Producing

Sources: Ministry of Natural Resources, District Offices in Southwestern Region, 1985.

million tonnes at 562 licenced and 110 wayside pits and quarries (Table 15.2), and with an estimated value of $70 million.

Current extraction of salt at 2 underground mines and 42 brine wells in the various Salina Formation salt units is primarily for de-icing, chemical (caustic soda, chlorine, soda ash), and foodgrade markets. Based on company estimates, total production declined below the 1984 level to 6.1 million tonnes valued at $130 million. This decline in production is mainly due to a labour strike at one of the rock salt mines.

The following are some of the new developments in Southwestern Region:

- startup of mosaic wall tile manufacture at the large, new, ultra-modern plant of Windsor Ceramic Tile Canada Limited;
- startup of large flower pot and giftware manufacture at the new plant of Castle Ceramics Limited in Norwich;
- extension of natural gas pipeline to the Parkhill plant of Martin Clay Products enabling the company to fire its kilns more efficiently for clayware manufacture competitive with plastic pipe;
- export of clay flue lining to U.S. markets for the first time by Canada Vitrified Products of St. Thomas, the sole Ontario manufacturer of clay flue lining and sewer pipe;
- specification of Adair Marble for the new Canadian Embassy in Washington;
- startup of new Bruce Marble and Stone quarry and 'dressing' operation in the Bruce Peninsula; and
- startup of new Burnes Pierce Quarry operation on Pelee Island ending importation of construction aggregates from Ohio.

The following are some of the new exploration and development activities planned for 1986 in Southwestern Region:

- startup of new Sutherland Construction Limited quarry operation for construction aggregates north of Owen Sound;
- exploration for new sources of construction aggregates in the London-Sarnia, Markdale-Meaford, and Owen Sound-Kincardine areas;
- assessment of the potential for concrete aggregates from the Lucas Formation in the Windsor-Leamington area;
- exploration of Kettle Point Formation shale as cement making raw material at a potential quarry site in the London-Sarnia area to facilitate planned changeover from wet to dry-processing at the Woodstock plant of Canada Cement Lafarge Limited;
- use of Arkona Formation shale and other local clays and shales in testing and manufacture of vitrified clay products replacing imported raw materials;
- assessment of the inactive Dresden Tile plant and clay deposit for brick manufacturing;

- exploration and testing of kaolinitic Bedford Formation shale;
- assessment of building stone potential using ground radar surveying techniques;
- exploration of Formosa Reef limestone at several deposits in the Wingham-Walkerton area as potential raw material for the glass industry; and,
- exploration of dune sands at several properties in the Grand Bend area as potential raw material for insulating fibre glass.

The following sections summarize for each commodity the mining, manufacturing, and exploration activities by industry, and pertinent activities by the Ontario Geological Survey and Southwestern Region. Region's activities include property examinations and area specific resource inventory and assessment projects as a means of stimulating new exploration and development, as well as providing effective input to resource planning and conducting or participating in displays, field trips, and workshops as a means of resource promotion.

Construction Aggregates

While sand and gravel aggregate production at licenced pit deposits in Southwestern Region in 1984 remained at the same level as during the previous year (14 million tonnes), wayside production (2.7 million tonnes) was up by 20% in response to growing highway construction needs.

Quarry production of crushed stone aggregates for construction purposes (2 million tonnes) increased across the Region, notably at Amherst Quarries Limited and Kennette Contracting Company Limited operating along with Allied Chemical in the Lucas Formation at the McGregor Quarry, southeast of Windsor, in the Chatham District (Figure 15.2a). This area has traditionally not been able to meet its needs in production of asphalt, concrete, and Granular A aggregates.

More than 2 million tonnes of crushed aggregates are imported annually from Komoka area pits southwest of London (South Winds Sand and Gravel), quarries in northern Michigan, and the Manitoulin Dolomite Incorporated quarry on Manitoulin Island. Docking facilities for unloading aggregates shipped from U.S. sources and Manitoulin Island exist at Point Edward (Sarnia), Courtright, Sombra, Windsor, and Kingsville. Aggregates from Komoka area sources are trucked to Lambton County and some of the nearer townships in Kent and Essex to supply growing specialty market needs.

The Burnes Pierce Quarry on Pelee Island started operating to supply crushed stone aggregates from Dundee Formation limestone for local construction needs replacing aggregates imported from Ohio. It is the only active quarry on the island.

Harold Sutherland Construction Limited plans to operate a new 200 000 tonnes per year crushed stone quarry in Amabel Formation dolostone located in the Niagara Escarpment area of Grey County, north of Owen Sound. The numerous plan review hearings, however, are becoming rather cost-prohibitive.

Accompanied by staff consulting to a major construction aggregate producer in the Region, several abandoned and operating pits and quarries, and other selected outcrops of granular and bedrock aggregate resource materials in the London-Lake Huron area were examined as a means of encouraging effective exploration and development of a new pit or quarry deposit in the area. Exploration at several selected sites will begin in 1986.

Together with staff consulting to a major aggregate producer from outside the Region, outcrops of Amabel Formation dolostone, located north of Markdale and away from the Niagara Escarpment Plan area were examined as a means of encouraging effective exploration and development of a new construction aggregate quarry operation. Exploration at one available property will commence in 1986.

Drill core samples from the lower part of the 30 to 35 m thick Dundee Formation limestone at Devran Petroleum Limited's proposed oil mining site near Sarnia (Figure 15.2b) were brought to the Ministry of Transportation and Communications for testing and assessment of construction aggregate potential. Preliminary results suggest suitability of the lower Dundee limestone at this site for granular base, subbase, and crushed maintenance materials. Sampling of the entire limestone sequence including the hard, dense central zone will commence in January 1986, when sinking of the shaft through the Dundee Formation at depths of 100 to 135 m takes place.

Southwestern Region's inventories and assessment of sand and gravel aggregate resources in deposits presently licenced under the Pits and Quarries Act have been carried out annually since 1983. These studies are intended to supplement ongoing inventories and assessments by the Aggregate Assessment Office of the Ontario Geological Survey which do not provide specific resource data on licenced commercial sources. Such information is critical for assessing present and short-term supplies of construction aggregate resources at the local level for effective input to the municipal land use planning process. The reports include information on geological descriptions, sampling, and estimates of the quantity and quality of remaining sand and gravel aggregate resources in the licenced sources. Laboratory analysis of the samples to determine grain size distribution, soundness, absorption, and lithology (petrographic number) are performed by the Materials Testing Laboratories of the Ministry of Transportation and Communications. Results of these projects are now complete for the Chatham, Wingham, and Owen Sound Districts. In 1985, W.R. Cowan of Palliser Environmental and Terrain Services Incorporated completed field studies in the Komoka, Byron, Fanshawe, and Simcoe areas. Studies will be continued in 1986 in the Aylmer District. Results of the projects are incorporated in Aggregate Resources Inventory Papers published by the Ontario Geological Survey and are made available to municipalities for land use planning purposes. A property report detailing the results is made available to each respective owner/operator. The Ministry of Transportation and Communications uses results of the studies for detailed assessment of new concrete fine and coarse aggregate potential in Southwestern Region.

Pit operations in Yarmouth Township are the chief producers of sand and gravel construction aggregates in Elgin County. These operations have ample supplies of sand but very limited workable amounts of gravel. A new area with high gravel potential, however, has been delineated on the basis of field studies in the Sparta Moraine area southeast of St. Thomas. (The Sparta Moraine is shown on Map P.2827; Dreimanis and Barnett 1985.) Field work was initiated in 1984, completed in 1985, and consisted of examination of buried sand and gravel at 15 pits, 26 hammer seismic refraction survey lines, 14 small diameter power auger holes, 7 large diameter power auger holes, and sampling. Samples were tested for potential aggregate quality by the Ministry of Transportation and Communications. Results of this project have been summarized in a Resources Report which can be obtained from the Petroleum Resources Laboratory and Aylmer District office. Results of this study will also be incorporated in the Aggregate Assessment Office report on Yarmouth Township to be published in 1986 by the Ontario Geological Survey.

Essex County has, aside from the upper lift in the upper part of the Lucas Formation (Anderdon Member) at Allied Chemical's McGregor Quarry, no known workable deposits suitable for the production of crushed aggregates of very high quality suitable for all aggregate uses including concrete structures and pavements (Koniuszy and Katona 1981). Crushed stone from this upper lift, however, is primarily used in making lime. A joint project by the Southwestern Region offices of the Ministry of Transportation and Communications and the Ministry of Natural Resources was initiated in 1985 to assess new potential of the Lucas Formation for high quality crushed aggregates in the McGregor-Leamington area. In December of 1985, the formation was drilled and cored (76 mm diameter) at the following three sites with relatively thin glacial drift overburden (7 to 18 m): one north of Leamington, another north of Harrow, and the third south of McGregor. Cores will be slabbed at the Petroleum Resources Laboratory and the Ministry of Transportation and Communications will perform aggregate quality testing of core samples in 1986.

Staff of the Aggregate Assessment Office of the Ontario Geological Survey completed field studies of aggregate resource potential in the following seven townships in Southwestern Region: Orford in Kent County; Adelaide and Metcalfe in Middlesex County; Hibbert and Wallace in Perth County; West Wawanosh in Huron County; and Amabel in Bruce County. Brief summaries of important findings during the field work in the above townships are presented by Gorman and Szoke (1985).

During 1985, the Ontario Geological Survey published the results of aggregate resource inventories of the following seven townships in the Region: Holland (ARIP 100), Sullivan (ARIP 101), Derby (ARIP 112), Sydenham (ARIP 118), and Keppel and Sarawak (ARIP 119) in Grey County; and Hullett (OFR 5552) in Huron County.

Lime

In the Beachville-Ingersoll 'lime valley' area, BeachviLime Limited (Dofasco) acquired Domtar's lime plant, pulverized stone plant, and quarry operations. The combined 1984 production of crushed high-calcium limestone from the Lucas Formation for calcining and mainly captive supply to the iron and steel industry from the BeachviLime Limited and Stelco Incorporated operations (1.6 million tonnes) represents approximately 74% of the total production in the Region for all lime markets and was 20% lower than during the previous year.

Allied Chemical Canada Limited continues to increase production of +25 mm (1 inch) screenings of crushed high-calcium limestone obtained from the 10 m high upper lift (Anderdon Member, Lucas Formation) at its McGregor Quarry. At the Amherstburg plant, the limestone screenings are calcined (quicklime, CO_2) and with ammoniated salt-in-brine used in the manufacture of soda ash and by-product calcium chloride by the Solvay process. Soda ash is used in the manufacture of glass (second largest fraction in the glass batch), detergents, pulp and paper, and other chemicals. Soda ash is also used in water and sewage treatment, mining, and textiles. Calcium chloride is used in road construction and maintenance, for dust control in the summer, and for de-icing in the winter as a substitute for rock salt when corrosion is a major concern or as liquid calcium chloride treated rock salt to reduce rock salt application. Fluorspar obtained from sources outside the Region is used in the manufacture of hydrofluoric acid, by-product gypsum, and other chemicals.

Grey Cement

The total 1984 production of local limestone and clay aggregates for grey cement manufacturing in the Region remained at the 1983 level of approximately 1 million tonnes.

The Woodstock plant of Canada Cement LaFarge Limited currently produces at 60% capacity. Quarrying activity has been extended downward through 29 m of high-calcium limestone (Lucas Formation) and 15 m of cherty limestone (Amherstburg Formation) to near the contact with the very siliceous limestone of the Bois Blanc Formation. New sources of dry shale are required to facilitate a planned changeover from wet to dry-processing of the raw materials. Since the plant also manufactures special types of cement, no winter shutdown is anticipated. The company plans to purchase at least 15 terminals in the Great Lakes area.

To optimize production of multiple types of cement at its Woodstock plant, Canada Cement Lafarge Limited completed 1372 m of diamond drilling (19 holes) through the Lucas, Amherstburg, and Bois Blanc Formations and into the Bass Islands Formation at the quarry site. Cores were split and sampled for chemical analysis. Split core from one hole, representative of the entire 80 m thick sequence, is stored at the Petroleum Resources Laboratory. The company also sampled the complex glacial drift overburden at the quarry for chemical analysis and shales and glacial lake clays at several pits and other outcrops scattered across the southern part of the Region. The

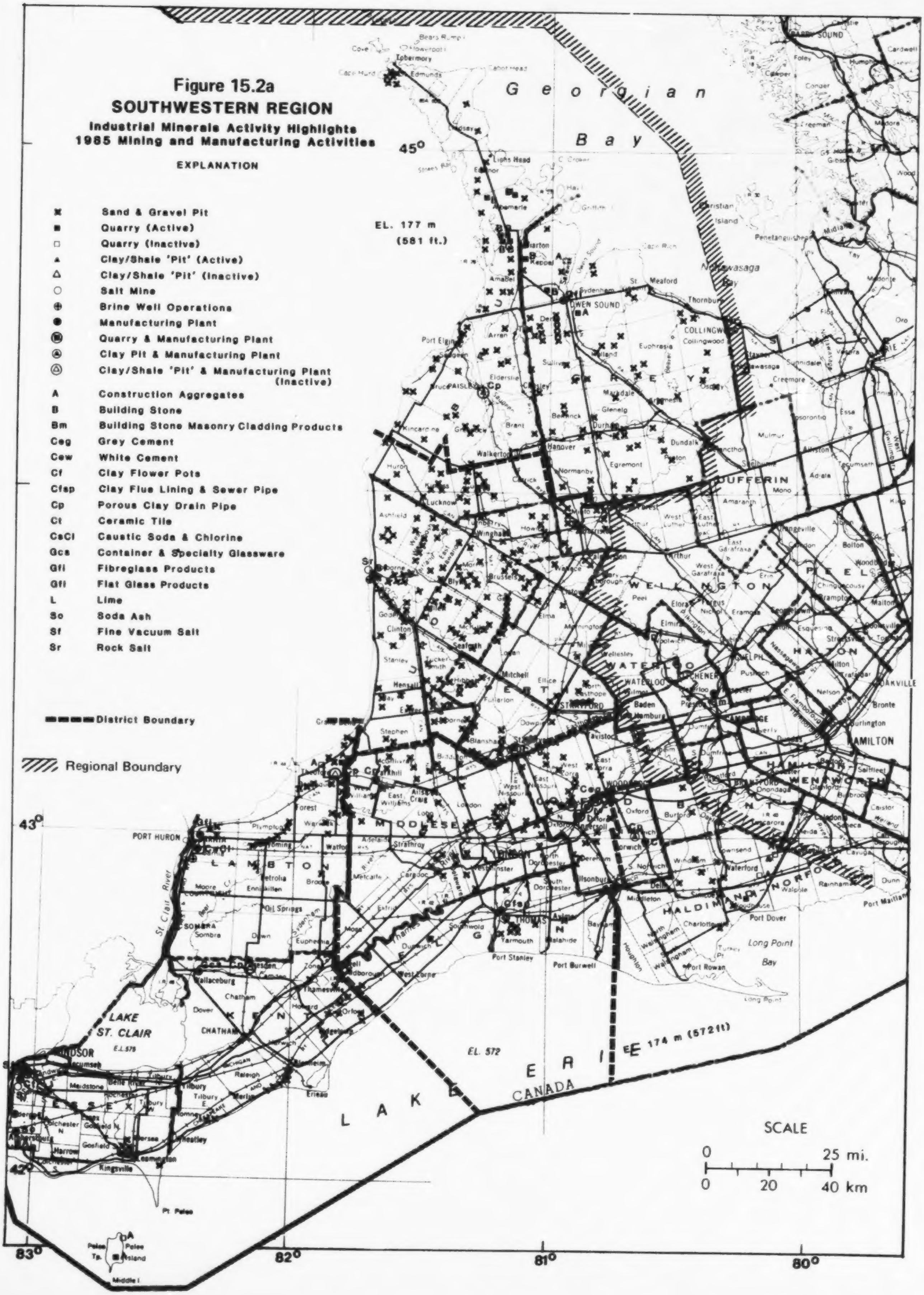

Figure 15.2a
SOUTHWESTERN REGION
Industrial Minerals Activity Highlights 1985 Mining and Manufacturing Activities

EXPLANATION

✖ Sand & Gravel Pit
■ Quarry (Active)
□ Quarry (Inactive)
▲ Clay/Shale 'Pit' (Active)
△ Clay/Shale 'Pit' (Inactive)
○ Salt Mine
⊕ Brine Well Operations
● Manufacturing Plant
⊚ Quarry & Manufacturing Plant
⊚ Clay Pit & Manufacturing Plant
⊚ Clay/Shale 'Pit' & Manufacturing Plant (Inactive)
A Construction Aggregates
B Building Stone
Bm Building Stone Masonry Cladding Products
Ceg Grey Cement
Cew White Cement
Cf Clay Flower Pots
Cfsp Clay Flue Lining & Sewer Pipe
Cp Porous Clay Drain Pipe
Ct Ceramic Tile
CsCl Caustic Soda & Chlorine
Gcs Container & Specialty Glassware
Gfi Fibreglass Products
Gfl Flat Glass Products
L Lime
So Soda Ash
Sf Fine Vacuum Salt
Sr Rock Salt
District Boundary
Regional Boundary
Georgian Bay
EL. 177 m (581 ft.)
Nottawasaga Bay
45°
43°
42°
83°
82°
81°
80°
GREY
DUFFERIN
PEEL
WELLINGTON
WATERLOO
HALTON
HAMILTON WENTWORTH
BRANT
HALDIMAND-NORFOLK
OXFORD
PERTH
HURON
MIDDLESEX
ELGIN
LAMBTON
KENT
ESSEX
OWEN SOUND
COLLINGWOOD
KITCHENER
GUELPH
STRATFORD
HAMILTON
OAKVILLE
PORT HURON
WINDSOR
CHATHAM
ST. THOMAS
LAKE ST. CLAIR
EL.575
St. Clair River
Long Point Bay
LAKE ERIE
EL. 572
174 m (572 ft)
CANADA
Pt. Pelee
Pelee Island
SCALE
0 25 mi.
0 20 40 km

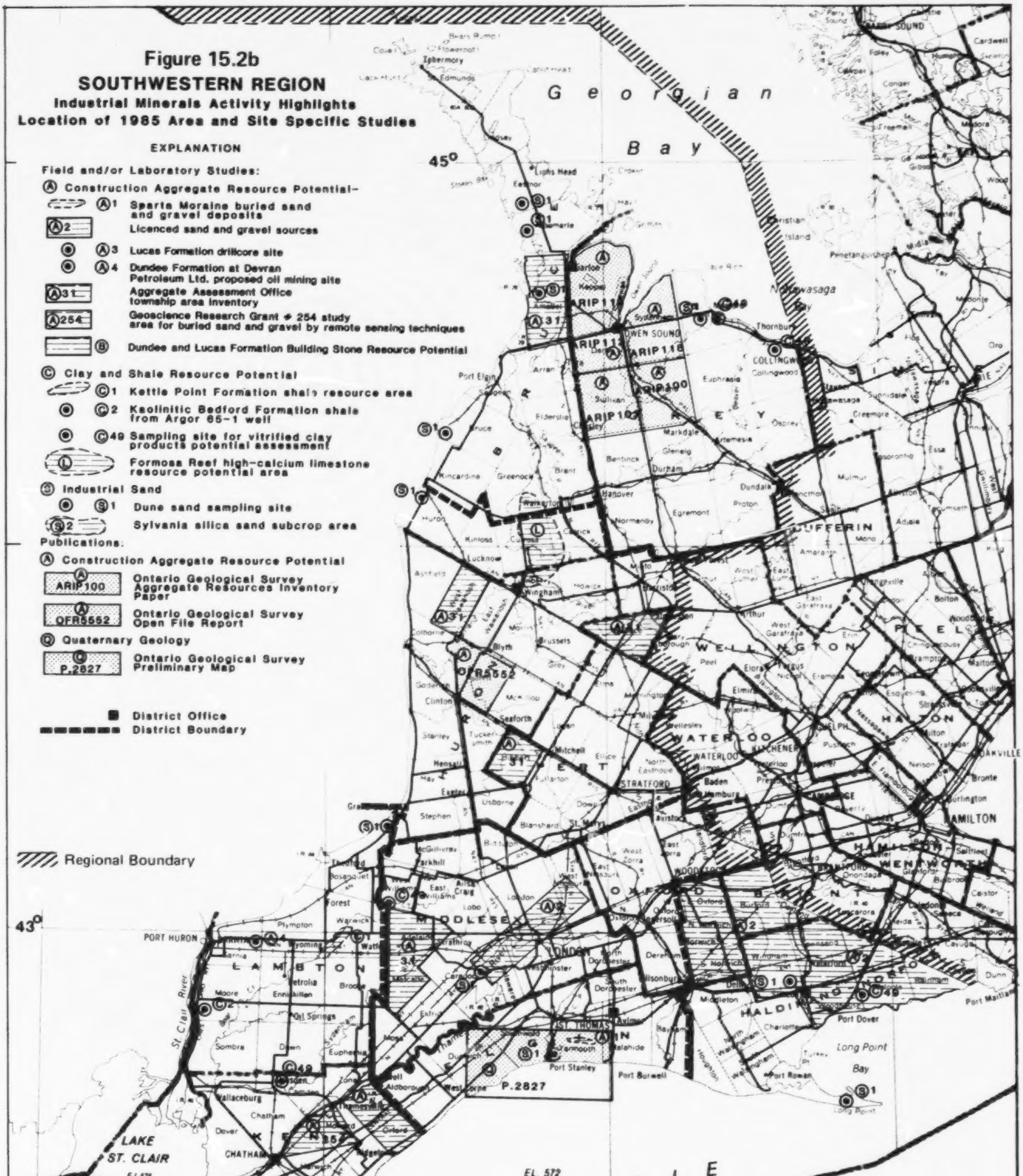

Figure 15.2b

SOUTHWESTERN REGION

Industrial Minerals Activity Highlights

Location of 1985 Area and Site Specific Studies

EXPLANATION
Field and/or Laboratory Studies:
Ⓐ Construction Aggregate Resource Potential-
Ⓐ1 Sparta Moraine buried sand and gravel deposits
Ⓐ2 Licenced sand and gravel sources
Ⓐ3 Lucas Formation drillcore site
Ⓐ4 Dundee Formation at Devran Petroleum Ltd. proposed oil mining site
Ⓐ31 Aggregate Assessment Office township area inventory
Ⓐ254 Geoscience Research Grant # 254 study area for buried sand and gravel by remote sensing techniques
Ⓑ Dundee and Lucas Formation Building Stone Resource Potential
Ⓒ Clay and Shale Resource Potential
Ⓒ1 Kettle Point Formation shale resource area
Ⓒ2 Kaolinitic Bedford Formation shale from Argor 65-1 well
Ⓒ49 Sampling site for vitrified clay products potential assessment
Ⓛ Formosa Reef high-calcium limestone resource potential area
Ⓢ Industrial Sand
Ⓢ1 Dune sand sampling site
Ⓢ2 Sylvania silica sand subcrop area
Publications:
Ⓐ Construction Aggregate Resource Potential
ARIP100 Ontario Geological Survey Aggregate Resources Inventory Paper
OFR5552 Ontario Geological Survey Open File Report
Ⓠ Quaternary Geology
P.2827 Ontario Geological Survey Preliminary Map
District Office
District Boundary
Regional Boundary
Georgian Bay
LAKE ERIE
LAKE ST. CLAIR
Long Point Bay
CANADA
EL. 572
EL. 575
45°
43°
42°
83°
82°
81°
80°
SCALE
0 25 mi.
0 20 40 km
WINDSOR
CHATHAM
LONDON
PORT HURON
STRATFORD
KITCHENER
WATERLOO
HAMILTON
OWEN SOUND
COLLINGWOOD
ST. THOMAS
OAKVILLE
LAMBTON
MIDDLESEX
ESSEX
KENT
ELGIN
HURON
PERTH
WATERLOO
WELLINGTON
DUFFERIN
GREY
BRUCE
HALTON
PEEL
HAMILTON-WENTWORTH
OXFORD
BRANT
HALDIMAND-NORFOLK
SIMCOE
ARIP 111
ARIP 116
ARIP 100
ARIP 10
OFR5552
P.2827
St. Clair River
Pt. Pelee
Pelee Island
Middle I.
Long Point

company plans to complete 10 shallow diamond-drill holes in January 1986 on a property in the London-Sarnia area to further evaluate the quartz- and organic-rich Kettle Point Formation shale as raw material for cement manufacture.

The St. Mary's Cement Company plant in St. Mary's resumed operation in May 1985 after a five-month shutdown. Its quarry produces crushed limestone (Dundee and Lucas Formations) and glacial clay aggregates for dry-mixing. Sales of cement are currently very good, and there will not be a scheduled winter shutdown for the first time in three years. New U.S. sales of cement and clinker have resulted from the opening of a new terminal and purchase of the Peerless cement plant in Detroit.

White Cement

The Woodstock plant of Federal White Cement is the largest white cement producer with 45% of the total annual production in North America. The dry-process plant uses a raw mix, 80% of which is composed of crushed high-calcium limestone (Lucas Formation) obtained from local lime producers in the Beachville-Ingersoll 'lime valley' area, and 20% of which is composed of imported silica fines, kaolin clay and high-reflectance gypsum and anhydrite.

Clay Products

In 1985, extraction of local clay and shale in the Region by the structural clay products industry is at four remaining plants exclusively for the manufacture of porous clay drain pipes. Martin Clay Products remains a strong leader in a declining industry researching new applications.

Other plants in the Region still import clays for the manufacture of vitrified structural clay products, ceramic tile, and pottery. Canada Vitrified Products is currently the sole Ontario manufacturer of vitrified clay chimney flue linings and sewer pipes. Replacement of costly long-haul transported clays by cheaper local sources will be necessary for the company to remain competitive.

The Region witnessed start-up production at two new plants: one for the manufacture of mosaic wall tile and other ceramic tile products at Windsor Ceramic Tile Canada Limited and the other for the manufacture of large flower pots and giftware at Castle Ceramics Limited in Norwich. Products from both plants are destined mainly for export markets in the U.S. Both plants combined will have created more than 200 new jobs when fully operational.

Barringer Research Limited of Rexdale measured 28% kaolinite in shale from the Lower Mississippian Bedford Formation. The sample is from a well drilled in 1965 in Moore Township, Lambton County. Clay mineral analysis for correlation purposes was performed on selected clay and shale samples obtained from Southwestern Region using the newly developed reflectance radiometry method ('Claypak' field method). Duplicate Bedford shale samples have been forwarded to the Geoscience Laboratories of the Ontario Geological Survey, Toronto, and the University of Waterloo for confirmation of the identification of kaolinite by conventional clay mineralogy techniques. Kaolinite has previously not been positively identified in clays or shales of southwestern Ontario. Kaolinitic clays and shales are extensively used in the manufacture of vitrified clay products.

Porous Clay Drain Pipe

Porous clay drain pipe manufacturing in Ontario has declined drastically from 86% of all drain pipe produced in the 1960s to <12% today due to markets lost to plastic pipe and lack of research and development. Manufacturing plants and nearby clay or shale 'pits' are concentrated in southwestern Ontario, the agricultural heartland of the Province, and specifically in Southwestern Region. This industry numbered 20 active plants in the Region during the 1960s; however, only 6 plants were active in 1984, providing employment for 85 people. These plants consumed a combined total of slightly more than 38 000 tonnes of clay and shale (10.5 million drain pipes), a rather small amount considering usage in brick or cement manufacturing. The combined total of local glacial lake clays extracted by Dresden Tile Yard (1981) Limited, Norwich Brick and Tile Yard (1979), and Paisley Brick and Tile Company Limited stood at the same level as in 1983 (12 540 tonnes). The combined total of Arkona Formation shale extracted by Martin Clay Products (Amos C. Martin Limited, Parkhill), and George Coultis and Son Limited at Hungry Hollow and Thedford, respectively, and Meaford-Dundas or Georgian Bay Formation shale extracted by Meaford Tile Limited increased by 18% over the 1983 level to 25 760 tonnes. This rise is entirely due to increased production at Martin Clay Products making it the leading producer of clay drain pipe. The usage of local clay and shale in drain pipe manufacturing in the Region is expected to decline in 1985 with the closure of the Dresden Tile and Meaford Tile plants and inactivity at the George Coultis and Son plant. Shale of the Arkona Formation, however, may see further use in the near future as raw material for pottery, flue lining, and sewer pipe manufacture in the Region, replacing costly imported clays and shales.

Martin Clay Products (Amos C. Martin Limited) manufactures porous clay drain pipe at two plants: one in Parkhill to service southwestern Ontario and another in Wallenstein to service mid-western Ontario. The company works two 'clay pits': one in more clayey shale of the Arkona Formation at Hungry Hollow near Arkona for raw material feed to both plants, and another at Georgetown in more silty Queenston Formation shale to service the Wallenstein plant. Completion in 1985 of a new pipeline facilitated the conversion from oil to more efficient natural gas firing of the kilns at the Parkhill plant. In 1985, Martin Clay Products also started manufacture of thinner-walled and smaller 3.5 inch (89 mm) diameter drain pipe to be competitive with 4 inch (102 mm) diameter plastic pipe. The company recently received a federal grant towards research on beneficiation of its 'clays' for the manufacture of new products (brick, floor tile, vitrified pipe) at both plants. Martin Clay Products is currently conducting trials with a faster drying-firing-cooling cycle for its clayware.

To assess potential of the entire Arkona Formation shale sequence as raw material at both Hungry Hollow north and south quarry sites, and to assist in quarry planning, Martin Clay Products cored one hole through 34.5 m of dry Arkona shale and 3 m of underlying Rockport Quarry Formation limestone near the type section of the Hungry Hollow Formation. The hole was drilled in the south quarry, the floor of which lies 9 m below the exposed contact between Arkona Formation shale and the overlying Hungry Hollow Formation limestone. Only the 9 m of shale below the quarry floor is similar to the top 9 m, i.e. grey clay shale with a few thin fossil bands. The remainder of the shale sequence contains frequent, thin, hard, calcareous interbeds of fossil hash and bioclastic mudstone. Slabbed, 76 mm (3 inch) diameter core of the entire sequence is stored at the Petroleum Resources Laboratory.

Dresden Tile Yard (1981) Limited closed its clay workings in September 1985 and is currently for sale. New interest in buying the plant and licenced pit deposit has already been expressed by the largest brick manufacturer in Italy during a recent visit by its staff and Toronto-based consultants. Samples of the clay deposit have been taken back to Italy for testing.

Vitrified Clay Flue Lining and Sewer Pipe

Canada Vitrified Products Division of National Sewer Pipe (NSP) Limited in St. Thomas is, since the closure of both NSP plants in Clarkson and Hamilton, currently the sole Ontario manufacturer of vitrified clay chimney flue linings, offsets, chimney tops, and vitrified clay sewer pipes, fittings, and accessories including rubber couplings. The company also manufactures vitrified clay products for specific agricultural and architectural purposes. The St. Thomas plant was originally established in 1934 to utilize imported clays from Pennsylvania shipped across Lake Erie to Port Stanley. Shale raw materials are presently trucked in from NSP's Queenston Formation deposit at Burlington and from a deposit of upper Devonian Machias shale in northwestern New York. Minor amounts of pulverized dolomite to control absorption in the clayware are trucked in from Hamilton. The sewer pipe greenware is fired in a shuttle kiln with 36 gas-burners providing even temperature distribution; flue lining greenware is fired in round, more efficient pressure-fired, downdraft periodic kilns. Both products are mainly for Ontario markets in residential and industrial construction; however, the company entered U.S. flue lining markets for the first time in 1985 and sales accounted for 25% of the total.

Canada Vitrified Products also began pre-production trials in 1985 of flue lining made from blends composed of shales of Queenston and Arkona Formations to replace costly imported New York shale. The company plans to try similar blends for sewer pipe manufacture. Clay sewer pipe was once widely used; however, PVC is now mainly used in smaller diameter markets and concrete pipe in larger diameter applications. Clay sewer pipe with superior acid resistance properties is still specified when corrosive chemicals will be passing through the drainage system; however, it may not be available locally. The company is currently also assessing new markets such as special brick, structural tile, and roofing tile. To remain competitive in clayware manufacture, it is essential for the St. Thomas plant to find suitable local clays such as those of the Arkona Formation to replace more costly distant sources.

New Start-Ups in Ceramics

Windsor Ceramic Tile Canada Limited, affiliated with U.S. Ceramic Tile Company of East Sparta, Ohio, started operation of a large, new, ultramodern ceramic tile plant including a mini-factory research and development centre in 1985 at Ojibway Park in Windsor. U.S. Ceramic Tile Company operates four plants in the U.S., two in Ohio, and one each in Mississippi and Pennsylvania. The Windsor plant equipment was designed, manufactured, and installed by Riedhammer Industrieofenbau Gesellschaft of Nurnberg, West Germany. The manufacturing process includes body preparation by wet mixing of proportioned quantities of clay and shale, slip preparation by wet grinding of body mix in ball mills, mixing of additives such as nepheline syenite at agitator tanks, pumping of body slip to slip arcs for storage, pumping of body slip to spray dryer where spraying of the slip through turbulent superheated air yields a pressable, granular material with 8% or less moisture, shaping of the flat greenware tiles by hydraulic dry-pressing, glazing, and biscuit firing at 1230°C of the greenware using a single layer fast-firing process in three sled-type, gas fired tunnel kilns each with 2787 m^2 (30 000 square feet) of tile per day capacity. The clay body consists of Pennsylvanian-age clay and shale imported from the Tuscarawas Valley area in northeastern Ohio. The clay material is a grey to buff firing, carbonate-free, low plastic, silty underclay composed mainly of kaolinite, illite, and quartz. The shale material is a red firing, carbonate-free, silty shale with abundant illite and quartz, and minor kaolinite. The company unsuccessfully tried using small quantities of local Essex County 'red top' clay in the body mix. Windsor Ceramic Tile Canada Limited is presently testing various Ontario and other Canadian clays. Nepheline syenite is supplied by an Ontario producer located outside the Region. Although targeted for start-up in March 1985, production did not begin until December due to production line modifications and a six-week strike at the plant. A two-line system is currently operative and the projected initial production level for 1986 is set at 1 million square metres (10 to 12 million square feet) of mosaic wall tile, i.e. more than Canada's entire production; it will increase further in 1986 when the third line is operative. Planned annual capacity of the Windsor plant is close to 3 million square metres of ceramic tile products, i.e. 25% of Canada's annual consumption, with 75% of the total shipments destined for U.S. markets and 25% for Canadian markets. At full capacity, the plant will provide 175 new jobs.

Castle Ceramics Limited started operation in 1985 of a new plant in Norwich for the manufacture of large flower pots and giftware using ball clays and feldspar imported from the U.S. The company imported plant equipment from The Netherlands and received a federal grant towards purchase of a new kiln and other equipment. Castle Ceramics Limited will be one of the largest potteries in the Region creating 30 new jobs when fully operational. Products are mainly for export markets in the U.S. The company has shown interest in testing local clays.

A study of the geology and ceramic properties of selected clay and shale deposits in south-central and southwestern Ontario was undertaken by Martini and Kwong (1985) for the Ministry of Natural Resources. The objectives of this study are as follows:

1. to evaluate selected clay and shale samples and mixtures as suitable raw materials for manufacture of clay roofing tile and other vitrified products;
2. to relate variations in ceramic properties of vitrified products to the geology of the clay and shale deposits; and
3. to establish exploration and mining criteria for resources needed for potential long-term industrial development.

Selected clay and shale raw materials from Southwestern Region include non-calcareous to moderately calcareous, red firing samples from licenced pits as well as promising new deposits. The licenced extraction sites are in lower Georgian Bay or Dundas Formation shale at Meaford, upper Arkona Formation shale at Hungry Hollow, and glacial lake clay at Dresden. The potential new deposits are in upper Blue Mountain Formation shale at Camperdown, upper Cabot Head Formation shale at Pyette Hill north of Owen Sound, and modern Nanticoke Creek alluvial loam north of Nanticoke. The results of this study will provide a valuable preliminary assessment of new potentials for alternate products from Region's 'heavy clays', i.e. vitrified clay roofing tile, clay pipe, industrial floor brick, structural tile, and ceramic wall and floor tile. The study is progressing very well and results in the form of an Open File Report will be available early in 1986.

The objectives of another clay and shale study are to compile available information on the geology, ceramic properties, location and land use constraints, exploration, mining, processing, and present and potential uses of Southwestern Region's clay and shale resources, and information on additives such as aluminous waste materials. The six-week long project is sponsored by Martin Clay Products under provisions of Canada Works-Section 38: Ontario Mining Sector Work Program. The project is carried out by D.J. Ackersviller, J.A. Hyatt, and L.C. Walkom under general supervision of the mineral resources geologist. The results of this compilation will be available in the form of an Open File Report in 1986.

Building Stone

There are currently six active limestone building stone producers operating at seven quarries in Amabel Formation dolostones of the Owen Sound-Wiarton-Hope Bay area in the Bruce Peninsula. They are as follows: Adair Marble Quarries, Owen Sound Ledgerock Limited, Ebel Quarries, Bruce Marble and Stone, Cliff McCartney, and Don Ross (Figure 15.2a). Combined production rose from 23 000 to 30 000 tonnes during the period from 1976 to 1979, declined to 20 000 tonnes in 1981, and rose again to 32 000 tonnes in 1984 with estimated gross sales of $6.5 million. Production in 1985 increased at all quarry operations providing year-round employment for 50 people and seasonal employment for an additional 70.

Adair Marble Quarries (Division of Arriscraft Corporation) quarries blue-grey, thick-bedded Wiarton-Colpoy Bay Member dolostone, producing 8 to 12 tonne size mill blocks by drilling and broaching. The quarry has been deepened to 8 m. Mill blocks are trucked to the Company's finishing plant at Cambridge. At the plant, the mill blocks are first placed in inventory for 'seasoning', then cut into product blocks using circular diamond saws up to 2 m in diameter, and then cut into required thicknesses by a modified gang saw or 'multiple saw' using up to 16 blades simultaneously. Different finished surfaces are produced using sanding, thermal-finishing, bush-hammering, and polishing equipment. Finished products are marketed as Adair Marble and include sills, coping, coursing stone, paving stone, slabbing, and thin wall overlay. The company markets and distributes its products through a network of more than 270 dealers in North America. Adair Marble products account for 25% of total sales of the company including a broad range of uniquely manufactured calcium silicate masonry cladding products. The following are some of the notable applications of Adair Marble:

1. conference desk and credenza of the Prime Minister's office;
2. restoration of three Laurier Locks, Rideau Canal, Ottawa;
3. phase I and II restoration of the Old Port of Quebec, Pointe-à-Carey;
4. new Court of Justice building in Ottawa where Adair Marble thin overlay is bonded to concrete wall units providing an attractive concrete facing.

Adair Marble is also specified for the new Canadian Embassy in Washington.

Owen Sound Ledgerock Limited, Ebel Quarries, Bruce Marble and Stone, McCartney, and Ross quarry grey-brown, light grey to buff weathering, readily parting, thin-bedded Eramosa Member dolostones by hand quarrying techniques. Quarry depths currently vary between 2 and 4 m. Stone dressing is accomplished on site or at one of the neighbouring operations. Owen Sound Ledgerock Limited is planning to enlarge the licenced areas at its Owen Sound and Wiarton quarry sites. After two years of inactivity at the Clearstone Quarry Industries Incorporated site (former Rouse or Perfect Stone quarry) near Highway 6 north of Mar, Bruce Marble and Stone obtained a three-year lease and started operation in 1985. In addition to the Eramosa Member, the company also quarries and dresses stone obtained from the overlying, buff, fine-grained, thick-bedded Guelph Formation dolostone at this site.

Building stone quarries of Adair Marble Quarries, Bruce Marble and Stone, and Owen Sound Ledgerock Limited in the Bruce Peninsula were examined in the company of L.G.D. Thompson from the Tweed Office of the Ministry of Natural Resources to assess shallow subsurface geophysical techniques for detection of bedding spacing and variations, particularly those related to biohermal development and reefal onlap respectively in Wiarton-Colpoy Bay and Eramosa Members of the Amabel Formation. Later, A-Cubed Incorporated of Mississauga carried out ground probing radar surveys for shallow subsurface (10 m) mapping of bedding features at one of the quarry sites. This method may be most economical for long and short term quarry planning and quality control.

The active quarry of Adair Marble at Hope Bay was visited in the company of Professor C.G. Winder and student Julian Kanarek of the University of Western Ontario to focus the latter's thesis study on pertinent geological parameters of the Amabel Formation at this building stone deposit.

A tour of the Bruce Peninsula building stone operations was conducted on October 8, 1985, in cooperation with the Ontario Association of Architects. The field trip was attended by 15 architects and several industry staff. All active quarry operations and processing facilities were visited including one private residence to demonstrate various stone applications. The tour was highly successful based on comments made by both building stone users and producers. Copies of the field trip guidebook are available at the Petroleum Resources Laboratory.

Southwestern Region geological staff conducted field inventories and assessments of potential dimension 'limestone' beds at past and present quarry operations excluding currently active building stone operations in the Bruce Peninsula. The most promising of all the potential dimension stone beds examined are the massive limestone layers in the Amherstburg and Pelee Island areas. At the Amherstburg quarry of Amherst Quarries Limited, blocks from several 2 m thick massive beds of limestone in upper and middle sections of the Lucas Formation have been recently 'dressed' by local stone masons for building uses. The building stone is very light grey, dense, and very fine grained or aphanitic in texture. The stone has been used in building of at least 20 homes in the Harrow area, the Windsor jailhouse extension, and for restoration of the McKenzie House in Windsor. Crushed stone quarrying activity at this operation is now at a minimum.

On Pelee Island, Dundee Formation bedrock is characterized by 1.5 to 3 m thick massive beds of buff or light grey fossiliferous limestone exposed at several licenced and abandoned quarry sites. Quarry blocks from this limestone formation were used in construction of the original Welland Canal locks. Applications of the building stone can be observed on and off the island in homes, churches, and other structures including breakwater armour stone hauled from licenced, but presently inactive, quarry operations. Mill blocks, which are 1.5 m thick, 4 m long, and more than 75 years old, can still be found at the abandoned William McCormick quarry on the island. Mill blocks from the same Dundee Formation limestone but then at the Anderdon quarry near Amherstburg were used in construction of, and still can be observed at, the lock chamber of the Sault Ste. Marie Canal which was completed more than 90 years ago. Applications of this building stone can also be seen at several historic buildings in Amherstburg. The Anderdon quarry is currently used for waste disposal.

Samples of these and several other promising dimension stone beds have been slabbed and polished, and are on display at the Petroleum Resources Laboratory together with photographs depicting various building stone applications. Sample cubes will be submitted for physical testing. Results of the project will be made available in 1986 in the form of a Resources Report on building stones of Southwestern Region.

Glass

The following three major glass plants are located in the Region:

1. Libby-St.Clair Incorporated in Wallaceburg manufactures container (beverage, storage) and specialty glassware (tableware);
2. PPG Canada Incorporated in Owen Sound manufactures flat glass for windows, windshields, doors, entire building curtain walls;
3. Fiberglass Canada Incorporated in Sarnia manufactures insulating (wool) fibre glass products for residential, commercial, and industrial applications.

The company's new research and development centre in Point Edward was officially opened in October 1985.

These glass plants use a wide variety of industrial minerals such as silica sand, soda ash, pulverized limestone, dolostone, nepheline syenite, salt cake, boron minerals, and colouring agents. Most of the minerals come from sources outside the Region except soda ash (Amherstburg), pulverized high-purity limestone (Beachville-Ingersoll area), and dolostone (Owen Sound).

E.C.King Contracting uses the -8 mm screening of Amabel Formation dolostone from its Sydenham Township quarry to produce sand-size aggregate at its Owen Sound Dolomite pulverizing plant for use in the manufacture of float-quality flat glass at the local PPG Canada Incorporated plant. By-product fines (Dolomite Filler #71,-180 microns) are used as aglime in northern Ontario and as filler in jointing compounds. Additional markets are sought for approximately 5000 tonnes.

Several relatively large eolian fine- to medium-grained sand deposits on properties operated by sand and gravel companies in the Grand Bend area (Pinery dunes) were examined for reported silica sand potential. Raw sand analysis by the Geoscience Laboratories of the Ontario Geological Survey, Toronto, suggests suitable gradation for insulating fibre glass manufacture but unsuitable mineralogical composition requiring removal of magnetic and carbonate minerals. Such benificiation may yield 50% recovery of a silica-feldspar concentrate of specified 'wool' fibre chemical composition.

Based on new interest by a glass manufacturing company, fossiliferous high-calcium Formosa Reef limestone of the Amherstburg Formation was sampled at five outcrops in the Wingham-Walkerton area for analysis of Co, Cr, Cu, Ni, and Mn by atomic absorption and ICP Spectrometer System methods at the Geoscience Laboratories, Ontario Geological Survey, Toronto. The measured concentrations in parts per million (ppm) are as follows: Co=<2; Cr=6-11; Cu=3-12; Ni=1-3; and Mn=42-70. These concentrations reflect perhaps the rich fauna present in the biohermal patch reef limestone. The concentrations of Cr, Cu, and Mn are relatively high considering requirements by the glass industry. Large drill core samples for further testing may be obtained by the company in 1986.

Natural Sands

Because of scarcity of information on natural sand deposits in Southwestern Region, samples of Quaternary sands from 40 different sites at licenced pits and other outcrops have been collected by regional geological staff for grain size, mineralogical and chemical analysis by the Geoscience Laboratories of the Ontario Geological Survey, Toronto. Twenty-eight samples of sand are from glaciofluvial and glaciolacustrine deposits, and twelve samples of sand are from eolian deposits scattered across the Region. Grain size of the samples falls basically into two groups: one consisting of fine- to medium-grained sand, and another consisting of coarse- to very coarse grained sand. In addition, six samples of silica sand from the Paleozoic Sylvania sandstone have been submitted to the Geoscience Laboratories, Ontario Geological Survey, Toronto, for mineralogical and chemical analysis. These samples are from wells drilled previously in Anderdon and Malden Townships, Essex County. Results of these and previous analyses of sands in the Region will be made available in 1986.

Industries in southern Ontario consume nearly 1 million tonnes of silica sand per year and none of it comes yet from the buried Sylvania sandstone in the Amherstburg area. Therefore, the objectives of another natural sand study are to compile and interpret available information on the geology, exploration, mining, processing, and market potential of silica sand from the Sylvania sandstone in Anderdon, Malden, North and South Colchester Townships, Essex County. This six-week long project is sponsored by McKean Quarries Limited (Sealey and Arnill Construction Limited) under provisions of Canada Works-Section 38: Ontario Mining Sector Program. The project is carried out at the Petroleum Resources Laboratory by D.J. Ackersviller, J.A. Hyatt, and L.C. Walkom under general supervision of the Mineral Resources Geologist. Results of this comprehensive study will be made available in the form of an Open File Report in 1986.

Rock Salt

A combined total of 4.5 million tonnes of rock salt was extracted during 1985 in Southwestern Region by underground mining methods. A modified room-and-pillar method is used in the 23 m thick Salina Formation A-2 Unit bed at a depth of 537 m at Domtar's Goderich Mine, and by conventional room-and-pillar design as employed in the 7.5 m thick Middle F Unit bed at a depth of 297 m at Canadian Salt's Ojibway Mine at Windsor. A production loss of one million tonnes at Goderich, due to a three-month strike during the summer, was only partly offset by an increase in production of 300 000 tonnes over the 1984 level at Windsor. Rock salt is primarily used in de-icing (80% to 85%), in chloralkali-manufacture (12% to 20%), and in minor miscellaneous markets including small-scale ion exchange water softening, and agricultural applications. Both companies export rock salt to the U.S.A.

Salt-in-Brine

Allied Chemical continued to extract salt using an underground solution method for on site industrial use from six wells into Salina Formation B Unit salt beds 30 m and 21 m thick at average depth of 335 m in the Amherstburg area. The company drilled two new wells for development into B Unit salt beds (Figure 15.1). Dow Chemical also continued to extract salt by brining for industrial use from 16 wells into B Unit and A-2 Unit salt beds 80 m and 37 m thick respectively at average depths of 740 m and 780 m in the Sarnia-Corunna area. The company drilled three new wells for development into the A-2 and B Unit salt beds. Total estimated production in 1985 by both companies (1.4 million tonnes) is 3% above the 1984 level. The extraction of salt by solution mining techniques by both companies is entirely for the industrial production of chloralkalis, i.e. chlorine and caustic soda at Dow Chemical and soda ash at Allied Chemical. Dow Chemical also manufactures hydrogen.

Fine Granular Vacuum Salt

The Canadian Salt Company Limited with 18 wells in production, and Domtar Incorporated with 2 wells in production, continue to extract B Unit salt brines from beds 30 m and 55 m thick respectively at depths varying between 427 m and 457 m in the Windsor and Goderich areas for the manufacture of evaporated, purified, fine granular vacuum salt products for open markets. Total estimated production in 1985 by both companies is 3% below the 1984 level. The extraction of salt brines by solution techniques followed by purification and vacuum-pan evaporation is mainly for food grade salt markets (60%), chemical industry (30% to 40%), and agricultural uses (10% to 20%).

ONTARIO GEOSCIENCE RESEARCH GRANTS

The following academic studies pertaining to Southwestern Region received Ontario Geoscience Research Grants for 1985-1986:

Grant 128: Subsurface Quaternary Stratigraphy Using Borehole Geophysics; R.N. Farvolden, J.P. Greenhouse, and P.F. Karrow, Department of Earth Sciences, University of Waterloo.

Grant 148: Geochemical Study of the Salina Group of Southern Ontario—Isotopes, and Major and Minor Elements; M.C. Miles, E.C. Appleyard, K. O'Shea, P. Lapcevic, S.K. Frape, and P. Fritz, Department of Earth Sciences, University of Waterloo.

Grant 205: Clay Mineralogy of Two Selected Carbonate Reservoirs in Southwestern Ontario; P.L. Churcher and M.B. Dusseault, Department of Earth Sciences, University of Waterloo.

Grant 254: Exploration for Buried Aggregate by Remote Sensing Techniques; M.B. Dusseault, Department of Earth Sciences, University of Waterloo.

Grant 271: Effect of Grain Size on Calcining Properties of Carbonates; P.P. Hudec, University of Windsor.

EXPLORATION TECHNOLOGY DEVELOPMENT FUND

The following technology development projects pertaining to Southwestern Region received funding for 1985-1986:

Grant 051: Development of a Field Portable Technique for the Analysis of the Magnetite, Hematite, and Ilmenite Content of Basal Tills; W.A. Morris, Morris Magnetics Incorporated, R.R.#2, Lucan, Ontario.

Grant 077: Development of a Field Portable Instrument for Semi-quantitative Mineral Determination in Geological Materials; M. Shats, D.R. Gladwell, and M. Dancziger, Barringer Research Limited, Rexdale, Ontario.

Grant 081: Development of Interactive Software for the MAGLOG Small Diameter Borehole System; W.A. Morris and S.J. Balch, Morris Magnetics Incorporated, R.R.#2, Lucan, Ontario.

Grant 087: High Resolution Shallow Soundings Using Radar and Reflection Seismic Methods; J.L. Davis and A.P. Annan, A-Cubed Incorporated, Mississauga, Ontario.

THESIS PROJECTS

M.Sc. THESES

University of Waterloo

Churcher, P.: Clay Mineralogy of Two Selected Carbonate Reservoirs in Southwestern Ontario.

Dollar, P.: Geochemical Studies of Formation Waters, Paleozoic Strata, Southwestern Ontario.

University of Western Ontario

Hart, B.R.: Intertill Glaciofluvial Deposits in Catfish Creek Drift, North Shore of Lake Erie near Bradtville.

Trevail, R.A.: Tectonic and Diagenetic Controls on the Development of Middle Ordovician Carbonate Reservoirs, Essex County, Ontario.

B.Sc. THESES

University of Western Ontario

Butler, J.W.: Coarse Gravels and Associated Sediments, Dorchester, Ontario.

Carlin, M.: Trenton-Black River Groups as Possible Source Rocks.

Kanarek, J.V.: Adair Marble Quarry, Bruce County, Ontario.

Mason, E.D.: Genesis and Stratigraphic Significance of Dunwich Drift.

Sibbick, S.J.: Geochemistry of the Dresden Meteorite.

Whittaker, W.: Glacial Geology of Lower Medway Valley, London.

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1985: Clays and Shales in Southern Ontario as Potential Ceramic Resources: p.249-252 *in* Summary of Field Work and Other Activities 1985, Ontario Geological Survey, edited by John Wood, Owen L. White, R.B. Barlow, and A.C. Colvine, Ontario Geological Survey, Miscellaneous Paper 126, 351p.

Ontario Energy Board

1985a: Reasons for Decision in the Matter of an Application under the Ontario Energy Board Act by G.W. Clarke Oil and Gas Company; E.B.O. 111, 68p., and 1 appendix.

1985b: Reasons for Decision in the Matter of an Application under the Ontario Energy Board Act by Ram Petroleums Limited; E.B.O. 114, 47p., and 1 appendix.

1985c: Report to the Minister of Natural Resources in the Matter of an Application by Proto Resources and Associates under Section 11 of the Petroleum Resources Act; E.B.R.M. 80, 10p.

Singhroy, V.H., and Trevail, R.A.

In Press: The Use of Remote Sensing Technology in the Search for Oil and Gas in Southern Ontario; Proceedings of the 24th Annual Conference of the Ontario Petroleum Institute.

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